New Approaches To Computer Games: Designers With A Difference

COMPUTE!'s GAZETTE

$2.95
December 1985
Issue 30, Vol. 3, No. 12
02220 $3.75 Canada

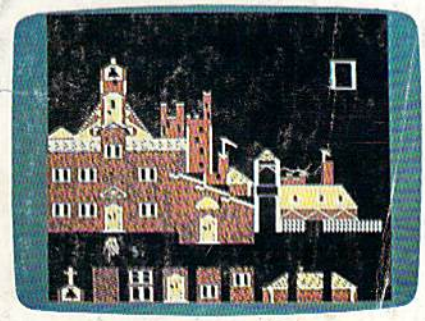
FOR COMMODORE PERSONAL COMPUTER USERS

Soft Write Protector For Disks

Easily lock and unlock individual files—or entire disks—with these short programs for the 64, 128, Plus/4, 16, and VIC.

SpeedCheck: A *SpeedScript* Spelling Checker For The Commodore 64 and 128

You can add and delete your own words. Also compatible with *WordPro* and *PaperClip*.

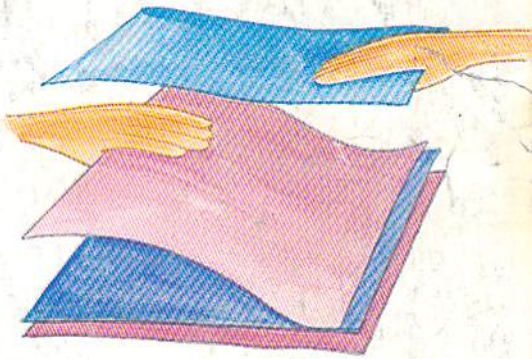


The Construction Set

Create astonishing art with this exceptional program for the Commodore 64 and 128.

Also In This Issue:

Disk File Archiver
User Group Update
Horizons: The Talking Computer
And More



Banners

Create professional-looking signs with this easy-to-use program for the 64, 128, Plus/4, 16, VIC, and any Commodore or compatible printer.

Quickchange

Things happen fast in this novel game. Three strategy games in one for the Commodore 64 and 128.

All Commodore 64 programs in this issue work on the Commodore 128 in 64 mode.

0 12
71486 02220

SOME HISTORIC BREAKTHROUGHS DON'T TAKE AS MUCH EXPLAINING AS COMPUSERVE.

But then, some historic breakthroughs could only take you from the cave to the tar pits and back again.

CompuServe, on the other hand, makes a considerably more civilized contribution to your life.

It turns that marvel of the 20th century, the personal computer, into something useful.

Unlike most personal computer products you read about, CompuServe is an information service. It isn't software. It isn't hardware. And you don't even have to know a thing about programming to use it. You subscribe to CompuServe —and 24 hours a day, 7 days a week, it puts a universe of information, entertainment and communications right at your fingertips.

A few of the hundreds of things you can do with CompuServe.

COMMUNICATE

EasyPlex™ Electronic Mail lets even beginners compose, edit, send and file messages the first time they get online. It puts friends, relatives and business associates—anywhere in the country —in constant, convenient touch.

CB Simulator features 72 channels for "talking" with thousands of other enthusiastic subscribers throughout the country and Canada. The chatter is frequently hilarious, the "handles" unforgettable, and the friendships hard and fast.

More than 100 Forums welcome your participation in "discussions" on all sorts of topics. There are Forums for computer owners, gourmet cooks, veterinarians, pilots, golfers, musicians, you name it! Also, Electronic Conferencing lets businesses put heads together without anyone having to leave the shop.

Bulletin Boards let you "post" messages where thousands will see them. You can use our National Bulletin Board or the specialized Bulletin Boards found in just about every Forum.

HAVE FUN

Our full range of games includes "You Guessed It!", the first online TV-style game show you play for real prizes; and MegaWars III, offering the ultimate in interactive excitement. And there are board, parlor, sports and educational games to play alone or against other subscribers throughout the country.

Movie Reviews keep that big night at the movies from being a five star mistake.

SHOP

THE ELECTRONIC MALL℠ gives you convenient, 24-hour-a-day, 7-day-a-week shopping for name brand goods and services at discount prices from nationally known stores and businesses.

SAVE ON TRIPS

Travelshopper℠ lets you scan flight availabilities (on virtually any airline — worldwide), find airfare bargains and order tickets right on your computer.

Worldwide Exchange sets you up with the perfect yacht, condo, villa, or whatever it takes to make your next vacation *a vacation*.

A to Z Travel/News Service provides the latest travel news plus complete information on over 20,000 hotels worldwide.

MAKE PHI BETA KAPPA

Grolier's Academic American Encyclopedia's Electronic Edition delivers a complete set of encyclopedias right to your living room just in time for today's homework. It's continuously updated... and doesn't take an inch of extra shelf space.

The College Board, operated by the College Entrance Examination Board, gives tips on preparing for the SAT, choosing a college and getting financial aid.

KEEP HEALTHY

Healthnet will never replace a real, live doctor—but it is an excellent and readily available source of health and medical information for the public.

Human Sexuality gives the civilization that put a man on the moon an intelligent alternative to the daily "Advice to the Lovelorn" columns. Hundreds turn to it for real answers.

BE INFORMED

All the latest news is at your fingertips. Sources include the AP news wire (covering all 50 states plus national news), the Washington Post, USA TODAY Update, specialized business and trade publications and more. You can find out instantly what Congress did yesterday; who finally won the game; and what's happening back in Oskaloosa with the touch of a button. And our electronic clipping service lets you tell us what to watch for. We'll electronically find, clip and file news for you...to read whenever you'd like.

INVEST WISELY

Comprehensive investment help just might tell you more about the stock you're looking at than the company's Chairman of the Board knows. (Don't know who he is? Chances are, we can fill you in on that, too.) CompuServe gives you complete statistics on over 10,000 NYSE, AMEX and OTC securities. Historic trading statistics on over 50,000 stocks, bonds, funds, issues and options. Five years of daily commodity quotes. Standard & Poor's. Value Line. And more than a dozen other investment tools.

Site II facilitates business decisions by providing you with demographic and sales potential information by state, county and zip code for the entire country.

National and Canadian business wires provide continuously updated news and press releases on hundreds of companies worldwide.

GET SPECIALIZED INFORMATION

Pilots get personalized flight plans, weather briefings, weather and radar maps, newsletters, etc.

Entrepreneurs use CompuServe too for complete step-by-step guidelines on how to incorporate the IBMs of tomorrow.

Lawyers, doctors, engineers, military veterans and businessmen of all types use similar specialized CompuServe resources pertinent to their unique needs.

And now for the pleasant surprise.

Although CompuServe makes the most of any computer, it's a remarkable value. With CompuServe, you get low start-up costs, low usage charges and local phone-call access in most major metropolitan areas.

Here's exactly how to use CompuServe.

First, relax.

There are no advanced computer skills required.

In fact, if you know how to buy breakfast, you already have the know-how you'll need to access any subject in our system. That's because it's "menu-driven," so beginners can simply read the menus (lists of options) that appear on their screens and then type in their selections.

Experts can skip the menus and just type in "GO" followed by the abbreviation for whatever topic they're after.

In case you ever get lost or confused, just type in "H" for help, and we'll immediately cut in with instructions that should save the day.

Besides, you can either ask questions online through our Feedback service or phone our Customer Service Department.

How to subscribe.

To access CompuServe, you'll need a CompuServe Subscription Kit, a computer, a modem to connect your computer to your phone, and in some cases, easy-to-use communications software. (Check the information that comes with your modem.)

With your Subscription Kit, you'll receive:

- a $25 usage credit.
- a complete hardcover Users Guide.
- your own exclusive user ID number and preliminary password.
- a subscription to CompuServe's monthly magazine, *Online Today.*

Call **800-848-8199** (in Ohio, 614-457-0802) to order your Subscription Kit or to receive more information. Or mail this coupon.

Kits are also available in computer stores, electronic equipment outlets and household catalogs. You can also subscribe with materials you'll find packed right in with many computers and modems sold today.

☐ Please send me additional information.
☐ Please send me a CompuServe Subscription Kit.
☐ I am enclosing my check for $39.95, plus $2.50 handling. *(Add sales tax if delivered in Ohio.)*

Please make check payable to CompuServe Information Services, Inc.

☐ Charge this to my VISA/MasterCard

_____

Expiration Date _____

Signature _____

Name _____

Address _____

City _____

State _____ Zip _____

MAIL TO:

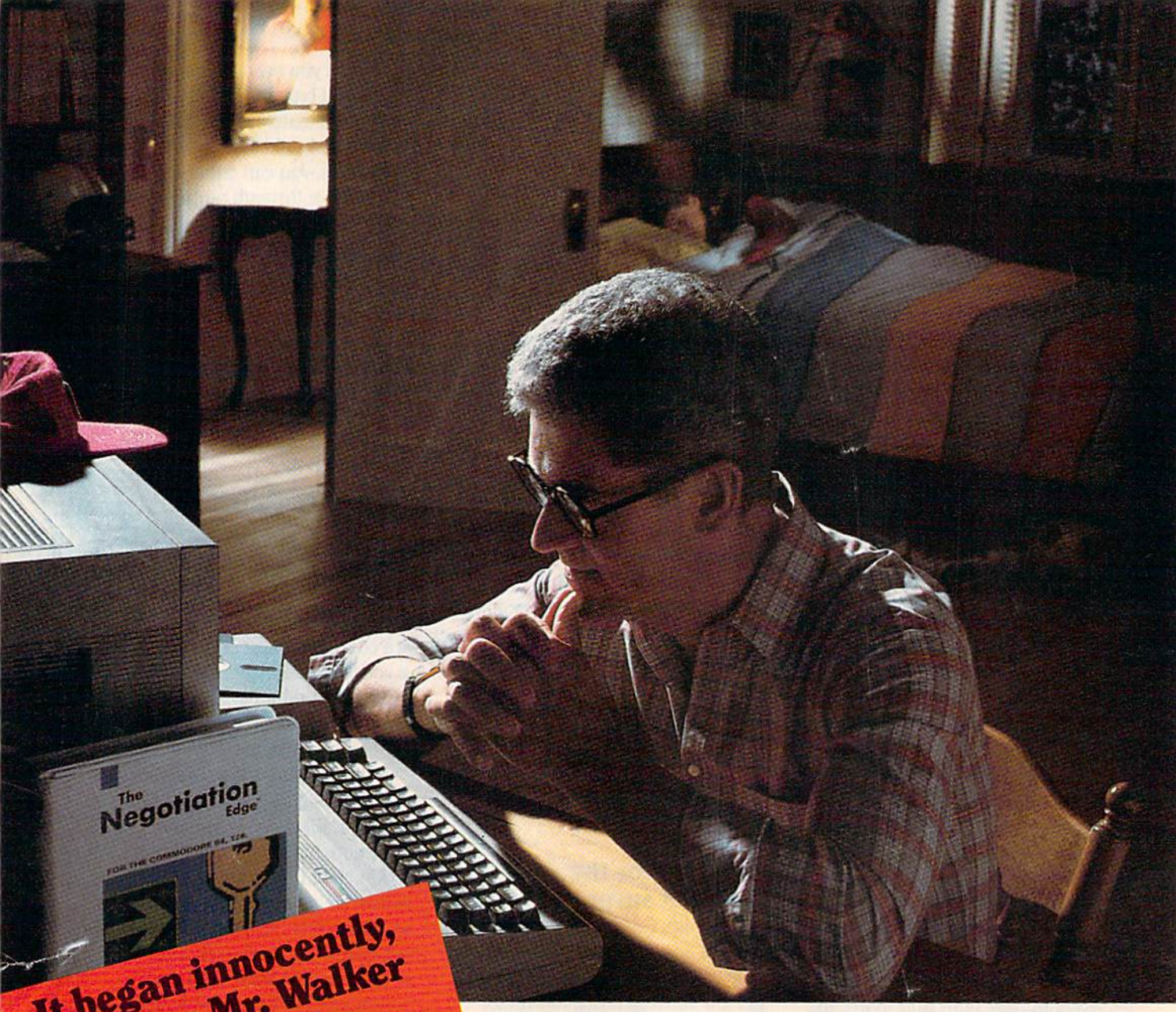
CompuServe®

Customer Service Ordering Dept.
P.O. Box L-477
Columbus, Ohio 43260

PRI-612

An H&R Block Company

EasyPlex and ELECTRONIC MALL are trademarks of CompuServe, Incorporated. Travelshopper is a service mark of TWA.



It began innocently, but soon Mr. Walker was running his entire career on little Bobby's Commodore.

Mr. Walker had never used a computer when he read about Info Designs' Negotiation Edge.™ He'd been meaning to ask for a raise and was looking for an "Edge."

That night, as Bobby slept, Mr. Walker's career turned. "Hey, Info Designs software makes Commodore® a terrific business computer."

The Edge line is people-insight software that's easy-to-use and only costs $79.95.*

He got the raise and bought the rest of the Edge line: The Sales Edge,™ Management Edge,™ and Communication Edge.™ His new love affair with Info Designs software was paying off.

Bobby's room became Mr. Walker's office away from the office. He bought Info Designs' WordPro III Plus™ package for $49.95 when he began issuing memos. And the complete Integrated Software Series for accounting: General Ledger, Payables, Receivables, Inventory, and Payroll for $49.95* each when he became a partner.

The ISS accounting modules are powerful, easy-to-use, and easy-to-learn. They include every business feature.

Mr. Walker was ecstatic with his new computerized business. And Bobby was happy because the monsters stayed in the closet while dad was in the room.

Don't let your Commodore and career sit on the shelf, Info Designs business software can help you get ahead. Buy it at your local software retailer. It makes good business sense.

*U.S. Currency. Accounting series marketed in different packaging for Canada.

InfoDesigns®

Find the entire line of Info Designs business software at a dealer near you.

The 10 power-packed products of Info Designs business software line:

The Sales Edge™

Provides individually tailored strategy reports to improve customer relationships.

After the sales executive has completed the self-assessment and the customer-assessment, a sales strategy report is generated instructing the salesman in aspects of business style and personality most likely to strike responsive chords with the style of a given client.

The Negotiation Edge™

Designed to help the user prepare, develop, and successfully complete any negotiation or bargain.

On the basis of information provided by the user about himself and a specific counterpart, the program produces a detailed negotiation plan. The plan includes a step-by-step blueprint for winning negotiations in a variety of personal and business situations.

The Management Edge™

Advises the manager how to get results by increasing productivity, successfully motivating subordinates, and resolving on-the-job-conflicts.

After the manager agrees or disagrees with a series of statements, the machine assimilates information from a bank of proven management tactics and selects those most appropriate to the specified subordinate. Suggestions are printed in a detailed management strategy report on how to work with the individual and get the desired results.

The Communication Edge™

Prepares you to work more effectively in meetings and conversations. It enables you to emphasize your communication strengths and avoid the potential pitfalls built into any conversation.

The program presents a series of simple questions to assess your communication style and the styles of counterparts. A strategy report is generated detailing ideas for a better relationship and ways to communicate more effectively.

General Ledger

Get a customized chart of accounts and comprehensive management report, including financial statements and trial balances. This integrated program maintains present months, quarter- and year-to-date, plus previous quarter and year balances. (Interfaces with Receivables, Payables, and Payroll.)

Receivables

Makes it simple to maintain complete customer master files, including year-to-date activity, credit limit, authorization, and current balance. Provides reports on aged open receivables, invoices, statements, and customer activity lists. (Interfaces with General Ledger for automated posting.)

Payables

Build a master vendor file, including year-to-date purchases, current balance, and recurring vendor invoice information. Provides automatic aging of open items, check with full remittance information and check register. (Interfaces with General Ledger for automated posting.)

Inventory

Perpetual inventory records for all items include stock numbers, average cost, three retail prices, reservations, economic order quantity and re-order levels. Processes stock receipts, issues, orders and adjustments with full audit trails. Provides key management reports, including stock status, shortage and recommended re-order reports.

Payroll

A master record for each employee includes current period, quarter- and year-to-date pay activity. Automatically calculates period pay amounts, including miscellaneous pay and deductions, federal, state, and local taxes and FICA. Provides comprehensive reports, including W2s, 941s, payroll checks with full pay/deductions detail and payroll journals. (Interfaces with General Ledger for automated postings.)

WordPro III Plus™

An easy-to-use, full-functioned word processor with an installed base of 50,000 units. It includes built-in mail merging for form letters and global search & replace. It provides automatic page numbering, headers, footers, and automatically totals columns.

Buy the Info Designs line at one of these dealers:

UNITED STATES

Software City, all locations

Arizona
Austin Telephone & Computers, Phoenix

California
Computer 64 Store, Bell Flower
Computer Outlet, San Diego
HT Electronics, Sunnyvale

Connecticut
SoftTown, Danbury
20th Century Television, Hartford

Delaware
Software Kingdom, Dover

Florida
AA Computers, Jacksonville

Illinois
A Software Store, Oaklawn

New Hampshire
Micon Computer, Londonderry
SoftSpot, Manchester

New Jersey
Software City, Cherry Hill

New York
Boscov's Dept. Stores, all stores
CIA Software, Bayside
Computer Plus, Deer Park
Computer Plus, Hewlett
Computer Plus, Lake Grove
Computerware, East Meadow
Micro Hutt, Bayshore
Micro Electronics, Valley Stream

Pennsylvania
Boscov's Dept. Stores, all stores
Whitehouse Computers, Williamsport
Some Hole In The Wall, Philadelphia

Texas
Babbages, Houston
Babbages, Dallas/Fort Worth
Federated/Videoland, all stores
The Computer Experience, San Antonio

Virginia
Virginia Micro Systems, Woodbridge

CANADA

Alberta
Compute or Play, Edmonton
Computerworks, Edmonton
Red Deer Microsystems, Red Deer
Selectdisk, Edmonton
Soft Options, Calgary
Wise Software Solutions, Calgary
Hindson Computing, Calgary
Hindson Computing, Lethbridge

British Columbia
Admiral Electronics, Surrey
Computer King, Prince George
Conti Computer System, Vancouver
Let's Compute Services, Kelowna
Nu-Tec Computers & Electronics, Vancouver
Owen & Sons, Victoria
Softstuff, Burnaby
Super Software Inc, Richmond
The Computer Shop, Williams Lake

Manitoba
Canadian Computer ERA, Brandon
Micromart Inc, Winnipeg

Newfoundland
J.W. Allan Ltd, St. John's

Nova Scotia
Kobetek Systems Ltd, New Minas

Ontario
Canadian Software Source, Toronto
Computer Country, Stratford
Comspec, Downsview
Con-pute, Oshawa
G. Plus, Ottawa
Games Plus, Midland
Mr. Diskette, Ottawa
Software Capitol, Ottawa

Quebec
Soft Wares Co., Montreal

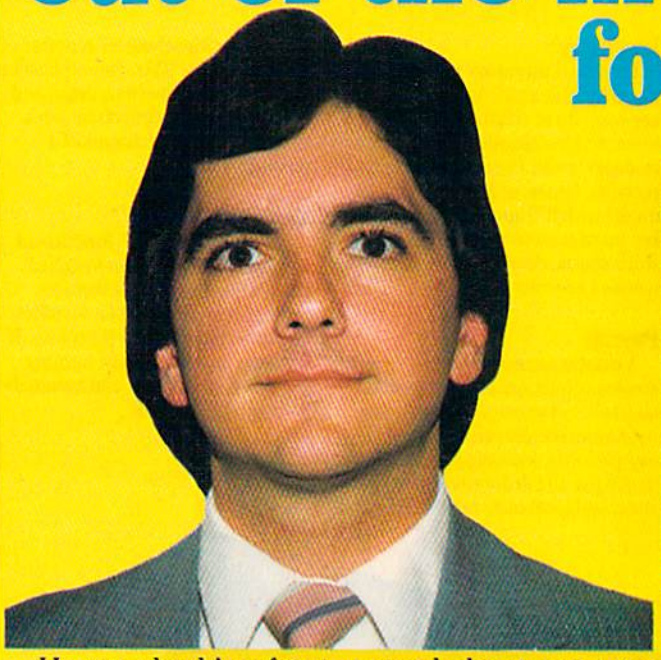
Saskatchewan
Memory Lane Computers, Saskatoon
Software Supermarket, Regina
Zycon Computing Ltd, Regina

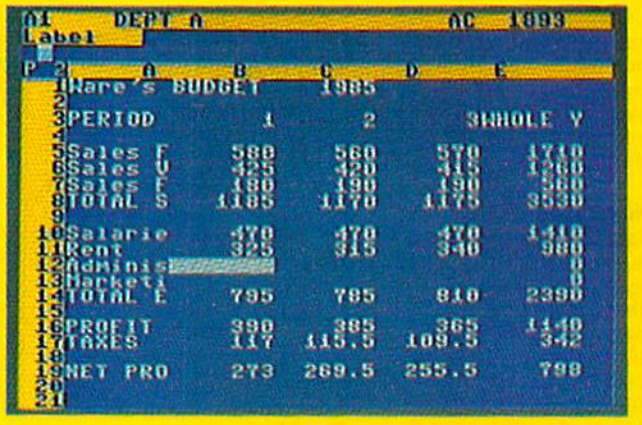
InfoDesigns®
445 Enterprise Court, Bloomfield Hills, MI 48013
(800) 445-INFO

Registered Trademark: Commodore–Commodore Electronics Limited.
Trademarks: The Negotiation Edge, The Sales Edge, The Communication Edge, and the Management Edge products–Human Edge Software Corporation–developed exclusively for Info Designs on the Commodore 64/128; WordPro III Plus–Professional Software–licensed to Info Designs.

"Calc Result cut 10 years out of the mortgage time for my house",

says Tony Muscarella.





	A	B	C	D	E
1	Mare's BUDGET		1985		
2					
3	PERIOD	1	2	3	WHOLE Y
4					
5	Sales F	580	560	570	1710
6	Sales U	425	420	415	1260
7	Sales T	180	190	190	560
8	TOTAL S	1185	1170	1175	3530
9					
10	Salarie	470	470	470	1410
11	Rent	325	315	340	980
12	Adminis				0
13	Marketi				0
14	TOTAL E	795	785	810	2390
15					
16	PROFIT	390	385	365	1140
17	TAXES	117	115.5	109.5	342
18					
19	NET PRO	273	269.5	255.5	798
20					
21					

Tony is a CPA, and works in Windsor Locks, CT. Tony bought his Calc Result two years ago. He was looking for a spread sheet program for the Commodore and found Calc Result.

"I think Calc Result is the best spread sheet on the market. It is very easy to use and logically built up. I have found the capacity I need in the program, and you can understand I have some demands, as I am an accountant. I did not believe that a homecomputer equipped with Calc Result could be so powerful.

I use the program for business as well as at home. The most frequent business use is loan amortization. With Calc Result it is a lot faster to see the status of a loan, and also how a change in the amortization will affect the payment time.

Calc Result showed me how a slight increase of 10—20 dollars per month on the house amortization could cut 10 years out of the amortization period for my house. Incredible!

Calc Result is a program that is very easy to use, and very powerful. I can really recommend it."

If you want some more information about Calc Result or any of Handic's products for Commodore 64, send in the coupon or call.

Calc Result is available in two versions, the Advanced version with 32 pages (discdrive required), or the Easy version (cartridge-based). Order either of the programs NOW, and we will include the book Applied Calc Result (value $14.95) for free.

handic software inc.

Sweden's leading software maker.

Yes, I want to save time and money. Please rush me:

☐ Calc Result Advanced $ 79.95
☐ Calc Result Easy $ 49.95 and include the book Applied Calc Result FREE. N.J. residents add 6% sales tax.)
☐ Payment enclosed (check or money order)
☐ VISA ☐ Master Card ☐ American Express

Acct.no. _____ Exp. date _____ Signature _____

☐ **Yes, please send me your catalogue FREE.**

Name _____

Address _____

City _____ State _____ Zip _____

Handic Software, inc. 400 Paterson Plank Rd, Carlstadt, N.J. 07072
Toll free number 1-800-524-0484

GAZETTE contents

December 1985 Vol. 3, No. 12

features

New Approaches to Computer Games: Designers with a Difference	*Kathy Yakal*	**24**	*
Building Your Own Games	*Selby Bateman*	**34**	*
Games at the Speed of Light	*Selby Bateman*	**36**	*
The Videodisc Connection	*Selby Bateman*	**38**	*

reviews

The Epson HI-80 Plotter	*Betsy Byrne*	**102**	
Calc Now!	*Art Hunkins*	**106**	
Charles Goren: Learning Bridge Made Easy	*Harvey B. Herman*	**108**	
The Halley Project: A Mission in our Solar System	*George Miller*	**108**	
Omniwriter/Omnispell	*Michael Kleinert*	**112**	
International Hockey	*George Miller*	**116**	
Also Worth Noting		**116**	

games

Whirlybird	*Philip Nelson*	**42**	**64†**
Quickchange	*Kevin Mykytyn and Mark Tuttle*	**46**	**64**
Dragon's Den	*Clark Book*	**54**	**64/+4/16**

education/home applications

Banners	*Doug Smoak*	**58**	**64/+4/16/V**
The Construction Set	*Fred Karg*	**60**	**64**
Computing for Families: Is Programming Dead?	*Fred D'Ignazio*	**128**	*

programming

SpeedCheck: Word Processor Spelling Checker	*Ottis R. Cowper*	**64**	**64**
Power BASIC: List Pager	*Robert Stoerrle*	**72**	**64/V**
Variable Saver	*G. Russ Davies*	**76**	**64/V**
Hints & Tips: Loading and Saving		**80**	**128/64/+4/16/V**
Soundpix	*Lawrence Cotton*	**86**	**64**
Disk File Archiver	*Keith Lossett*	**93**	**64**
Auto Time and Date	*David Archibald*	**94**	**64**
Soft Write Protector for Disks	*Don Lewis*	**97**	**64/+4/16/V**
Trackmouse	*Warren Block*	**100**	**64**
Machine Language for Beginners: ML Mailbag	*Richard Mansfield*	**129**	**64/V**
BASIC Magic: A Holiday Lesson for New Computer Owners	*Michael S. Tomczyk*	**136**	**64/+4/16/V**

departments

The Editor's Notes	*Robert C. Lock*	**6**	*
Gazette Feedback	*Editors and Readers*	**10**	*
Simple Answers to Common Questions	*Tom R. Halfhill*	**120**	*
Horizons: The Talking Computer	*Charles Brannon*	**124**	*
User Group Update		**138**	*
Bug-Swatter: Modifications and Corrections		**139**	*

program listings

How to Type In COMPUTE!'s Gazette Programs		**140**	*
The Automatic Proofreader		**141**	*
MLX: Machine Language Entry Program		**142**	**64**
Product Mart		**183**	
Advertisers Index		**192**	

† All Commodore 64 programs in this issue work on the Commodore 128 in 64 mode.

*=General, **V**=VIC-20, **64**=Commodore 64, **+4**=Plus/4, **16**=Commodore 16, **128**=Commodore 128

COMPUTE!'s GAZETTE is published monthly by **COMPUTE!** Publications, Inc., Post Office Box 5406, Greensboro, NC 27403 USA. Phone: (919) 275-9809. Editorial offices are located at 324 West Wendover Avenue, Greensboro, NC 27408. Domestic Subscriptions: 12 issues, $24. POSTMASTER: Send address changes to *COMPUTE!'s GAZETTE*, P.O. Box 10958, Des Moines, IA 50950. Second class application pending at Greensboro, NC 27403 and additional mailing offices. Entire contents copyright ©1985 by **COMPUTE!** Publications, Inc. All rights reserved. ISSN 0737-3716.

COMPUTE! Publications, Inc., One of the ABC Publishing Companies: ABC Publishing, President, Robert G. Burton; 1330 Avenue of the Americas; New York, New York 10019.

editor's notes

Our Seasonal Cheer

Whither Amiga? At this October writing, we're anxiously awaiting the arrival of the first Amiga in our local store. *Anxiously* because the software's apparently coming in segments, what with the initial basic system due to ship in September, and the slow IBM-compatible software due to ship in October or November, and the faster IBM-compatible software due to ship by December, and, well, you get the picture. This introduction raises the spectre of Tramiels' past.

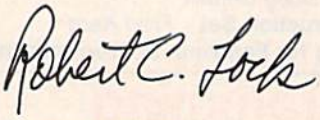
Enough of this snippy sniping though. We're really anxious because we're always anxious whenever Commodore is shipping a new product, or even preparing to ship a new product, or even announcing preparations to ship a new product. We, frankly, like Commodore products. Over the years Commodore has proven to be beneficial to the growth and competitive spirit in this industry. A series of quite successful Commodore machines has alternately upgraded, shaken, or sometimes helped drive this industry. Millions upon millions of us actively use Commodore computers. So it comes as no great shock that there might be a few delays on selected parts of the Amiga. And we're sure—rightly or wrongly—that we'll convince ourselves that they were worth waiting for because over the years of waiting for various bits and pieces of Commodore products we've always convinced ourselves.

Hopefully, by the time this reaches you, aisles will be full of cheerful, cherubic Amiga buyers, and, hopefully, those buyers plus all the thousands and thousands of you who are purchasing 128 systems will help Commodore have a happy and joyous quarter. Recent indications are that they need it. Our own early seasonal indications are that they might very well *have* a strong holiday sales season. On that positive note, we wish you all, our readers, and you, too, Commodore, a prosperous and exceptionally pleasant holiday and new year.

While we're tooting horns, we'd like to bring to your attention several significant new books from the editors at COMPUTE!. The two most directly relevant to you are *The Programmer's Guide to the 128* and *The Programmer's Guide to the Amiga*. The former is due out in December; the latter in January. As you know, we very rarely mention one of our own books in the editorial page, but this constitutes one of those exceptional cases. For the first time ever, we assembled a strong team of COMPUTE! staff editors and programmers and set them to work on developing a book from the ground up. We have never attempted a project with this approach before, and we expect you'll be quite pleased with our efforts. We've assembled an exceptional team here over the years, and are personally pleased when such a project develops the enthusiasm that this one has.

In this issue, you'll find "SpeedCheck," a spelling checker program that's compatible with *SpeedScript*, *WordPro*, and *PaperClip*, three of the best-known word processing programs for Commodore available today. The program can be easily customized to suit your writing needs. If you're a subscriber to the GAZETTE DISK, as a special bonus this issue, you'll find a 2,000-word dictionary included with this program.

Enjoy your GAZETTE.



Editor In Chief

IF YOU CAN FIND A BETTER PROGRAM WE'LL BUY IT FOR YOU!*

WORD WRITER with Spell Checker

Now with 85,000 word Spelling Checker

- An efficient, 80-column professional word processing system which includes a spelling checker and built-in calculator.
- Contains all the features you'll need for everyday word processing, plus most of the sophisticated features found in more expensive programs: document chaining, form letter printout, page separations, horizontal and vertical scrolling, and more.

With Timeworks you get more power for your dollar

You can use each program alone. Or interface this trio – one at a time if you like – into a completely integrated productivity system that delivers all the power and features most of you will ever need . . . at a cost that lets you enjoy their use.

Look for these and other Timeworks programs at your favorite dealer. Or contact Timeworks, 444 Lake Cook Road, Deerfield, IL 60015. Phone: (312) 948-9200.

DATA MANAGER 2

Faster, more efficient, more versatile

- A complete general information storage and retrieval system with report-writing, graphics, statistics, and label-making capabilities.
- Exclusive X-SEARCH, X-SORT, and X-CHART features allow you to cross-search any category of information; sort items alphabetically, numerically, or by date; break down statistical information into categories; and graphically view your results.

With Timeworks you get more than software

You Get Our Customer Technical Support Team

At the other end of our toll-free hotline, you'll find our full-time Customer Technical Support Team. Free of charge to all registered users.

You Get Our Liberal Trade-Up Policy

You'll find the details inside each package.

SWIFTCALC with SIDEWAYS

New easy-to-use spreadsheet for home and small business use

- The SIDEWAYS option lets you print all your columns on one, continuous sheet . . . sideways.
- 250 rows and up to 250 columns (128K version) provide up to 62,500 cells (locations on the spreadsheet) in which to place information.
- Performs mathematical functions up to 17 digits. Allows the use of minimum and maximum values, averages, sums, integers, absolute values and exponential notation.

*With Timeworks you get our Money Back Guarantee

If you can find anything that works better for you, simply send us your Timeworks program, your paid receipt, and the name of the program you want, along with your check or credit card number for any retail price difference. If it's available, we'll buy it for you.**

For Apple, IBM, Commodore 128 (128K) & Commodore 64 Computers

TIMEWORKS®

More power for your dollar.

Other Timeworks Programs:
- The Evelyn Wood Dynamic Reader
- Sylvia Porter's Personal Finance Series
- Swiftax ■ Cave of the Word Wizard
- Business Systems ■ Wall Street
- The Electronic Checkbook
- The Money Manager

These programs interface with each other

Now available for Commodore 128

** Offer valid for 90 days from date of purchase.

*** Registered trademarks of Apple Computer, Inc., International Business Machines Corporation, and Commodore Computer Systems

© 1985 Timeworks, Inc. All rights reserved.

COMPUTE! Publications, Inc.
One of the ABC Publishing Companies

Publisher James Casella
Founder/Editor in Chief Robert C. Lock
Director of Administration Alice S. Wolfe
Senior Editor Richard Mansfield
Managing Editor Kathleen Martinek
Editor Lance Elko
Assistant Editor Todd Heimarck
Production Director Tony Roberts

Editors
Tom R. Halfhill, Editor, COMPUTE! Magazine; Stephen Levy, Editor, COMPUTE! Books Division; Gail Cowper, Production Editor; Ottis R. Cowper, Technical Editor; Charles Brannon, Program Editor; Selby Bateman, Features Editor
Assistant Editors
Gregg Keizer (Books); John Krause, George Miller, (Technical); Philip Nelson (COMPUTE! Magazine); Kathy Yakal, Assistant Features Editor; Mark Tuttle, Submissions Reviewer
Editorial Programmers
Patrick Parrish (Supervisor), Tim Victor, Kevin Mykytyn
Programming Assistant
David Florance
Copy Editors
Joan Rouleau, Ann Davies
Administrative Staff
Executive Assistant, Debi Nash; Julia Fleming, Iris Brooks, Jan Kretlow

Production
Irma Swain, Production Manager; Janice Fary, Art & Design Director; Lee Noel, Assistant Editor, Art & Design; De Potter, Mechanical Art Supervisor; Terry Cash, Carole Dunton, Typesetting
Artists
Dabney Ketrow (Publications), Debbie Bray (Books); Harry Blair, Illustrator

Associate Editors
Jim Butterfield (Toronto), Harvey Herman (Greensboro), Fred D'Ignazio (Roanoke)

Customer Service
Philippa King, Customer Service Manager; Gail Jones, Dealer Sales Supervisor; Judy Taylor, Customer Service Supervisor; Dealer Sales Staff: Rhonda Savage, Liz Krusenstjerna; Customer Service Staff: Betty Atkins, Gayle Benbow, Mary Hunt, Jenna Nash, Chris Patty

Receptionist, Anita Armfield

Lonnie Arden, Warehouse Manager; Staff: Howard Ayers, Steve Bowman, David Hensley, Larry O'Connor

Data Processing
Leon Stokes, Manager; Chris Cain, Assistant

Accounting
Paul J. Megliola, VP, Finance & Planning; R. Steven Vetter, Director, Finance & Planning; Robert Bean, General Accountant; Karen K. Rogalski, Financial Analyst; Staff: Dale Branch, Jill Pope
Credit
Barry L. Beck, Credit Manager; Staff: Sybil Agee, Anne Ferguson, Pat Fuller, Doris Hall, Linda Miller, Mary Waddell, Jane Wiggs
Purchasing
Gregory L. Smith, Purchasing Manager

Promotion
Caroline Dark, Promotion Assistant
Advertising Sales
Ken Woodard, Director of Advertising Sales; Patti Stokes, Production Coordinator; Kathleen Hanlon, Administrative Assistant
Sales Representatives

Jerry Thompson	415-348-8222
Ed Winchell	213-378-8361
Harry Blair	919-275-9809

Jules E. Thompson, Inc.
National and Canadian Sales Representatives
1290 Howard Avenue, Suite 303
Burlingame, CA 94010

Address all advertising materials to:
Patti Stokes, COMPUTE!'s GAZETTE
324 West Wendover Ave., Suite 200, Greensboro, NC 27408

Sales Offices, The Thompson Company

New England	617-720-1888
Mid-Atlantic	212-772-0933
Southeast	919-275-9809
Midwest	312-726-6047
Texas	713-731-2605
Northwest, Nevada	408-354-5553
Northern CA	415-348-8222
Southern CA	213-378-8361
Arizona	213-378-8361
New Mexico	213-378-8361
Colorado	303-595-9299

Member ABC Audit Bureau of Circulations

COMPUTE! Publications, Inc., publishes
COMPUTE! **COMPUTE! Books** ***COMPUTE!'s GAZETTE***

Corporate Office:
324 West Wendover Ave., Suite 200, Greensboro, NC 27408
Mailing Address:
Post Office Box 5406, Greensboro, NC 27403
Distribution Center
500-A Radar Road, Greensboro, NC 27419
Telephone: 919-275-9809
Office Hours: 8:30 AM to 4:30 PM Monday–Friday

President Robert G. Burton
Vice President, Finance & Planning Paul J. Megliola

Subscription Orders
COMPUTE!'s GAZETTE
P.O. Box 10958, Des Moines, IA 50950

TOLL FREE
Subscription Order Line
800-334-0868
In NC 919-275-9809

COMPUTE!'s GAZETTE
Subscription Rates

(12 Issue Year): US (one year) $24. Canada, Mexico and Foreign Surface Mail $30. Foreign Air Mail $65.

The COMPUTE!'s GAZETTE subscriber list is made available to carefully screened organizations with a product or service which may be of interest to our readers. If you prefer not to receive such mailings, please send an exact copy of your subscription label to: COMPUTE!'s GAZETTE, P.O. Box 10958, Des Moines, IA 50950. Include a note indicating your preference to receive only your subscription.

Authors of manuscripts warrant that all materials submitted to COMPUTE!'s GAZETTE are original materials with full ownership rights resident in said authors. By submitting articles to COMPUTE!'s GAZETTE, authors acknowledge that such materials, upon acceptance for publication, become the exclusive property of **COMPUTE!** Publications, Inc. No portion of this magazine may be reproduced in any form without written permission from the publisher. Entire contents copyright © 1985, **COMPUTE!** Publications, Inc. Rights to programs developed and submitted by authors are explained in our author contract. Unsolicited materials not accepted for publication will be returned if author provides a self-addressed, stamped envelope. Where programs are included in an article submission, a tape or disk must accompany the submission. Printed listings are optional, but helpful. Articles should be furnished as typed copy (upper and lowercase, please) with double spacing. Each article page should bear the title of the article, date, and name of the author. **COMPUTE!** Publications, Inc., assumes no liability for errors in articles or advertisements. Opinions expressed by authors are not necessarily those of **COMPUTE!** Publications, Inc. **COMPUTE!** Publications assumes no responsibility for damages, delays, or failure of shipment in connection with authors' offer to make tape or disk copies of programs published herein.

PET, CBM, VIC-20, Commodore 64, Plus/4, 16, and 128 are trademarks of Commodore Business Machines, Inc., and/or Commodore Electronics Limited. Other than as an independent supplier of quality information and services to owners and users of Commodore products, **COMPUTE!** Publications, Inc., is in no way associated with Commodore Business Machines, Inc., or any of its subsidiaries.

Resolved at Last!

The Greatest Super Bowl Team of All Time!

(NOW DUST OFF YOUR COMPUTER . . . AND FIND OUT!)

Find out for yourself which football team was the best ever. Find out who were the really best coaches . . . and who were the bums. Find out who were best under pressure. Was it the Colts' Johnny Unitas, Joe Thiesmann and the Redskins or the Jets' Joe Namath, or maybe it was Packer coach Vince Lombardi who made the difference after all? Super Bowl Sunday sets the stage for YOU to take control.

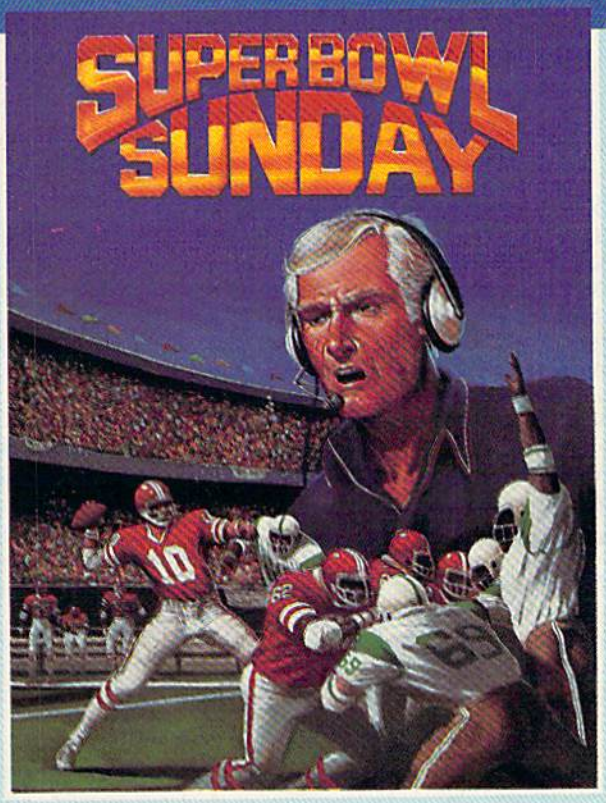
Now YOU Get that Chance!

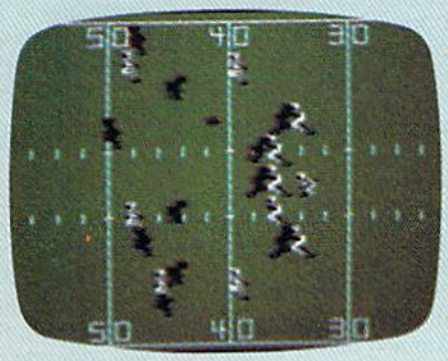
Super Bowl Sunday gives you the 20 greatest Super Bowl teams of all time, computer analyzed to perform with proper guidance, just as they did in real life. In Super Bowl Sunday you can match up any team against any other regardless of year . . . here's your chance to resolve once and for all who the best of the best really is.

Three Modes of Play!

Super Bowl Sunday is really 3 games in one; you can play head-to-head against another live opponent in the 2-player version . . . or play solitaire against the computer programmed to react to your strategy . . . or set the computer on autoplay and watch the computer play against itself.

Regardless of which version, you will be amazed at the graphics. This is the only statistically authentic game to give you all 22 players on the screen at once going through the actual play in animated action.





Full-screen re-enactment of all your plays!

The Greatest Super Bowl Team is . . .

We're not giving away any secrets—just set your game on autoplay and you might get the answer. But, if you think you're a coaching genius, by playing the other versions you might change history after all. Super Bowl Sunday challenges you to do just that! Super Bowl Sunday is ready to run on your:

Apple® II Family, Commodore® 64/128 and IBM® PC, PCjr. $35.00

Season disks (where you can re-create an entire season) also available separately.

® Trademark Apple Incorporated, Commodore Business Machines, and International Business Machines

Here's Everything You Get:

- ★ **20 Super Bowl Teams** including all the players' names and positions (press the "L" key and you see the strengths of each offensive vs defensive matchup based on seasonal performances).
- ★ More than a dozen **offensive and defensive plays** to choose, giving YOU control over which players do what.
- ★ Individual players' performances and statistics are updated throughout the game. You can view them during and after the game on your screen or keep permanent records using the printer option.
- ★ Your brilliant play re-enacted by **all 22 players** on the screen.
- ★ **Three modes of play:** head-to-head, solitaire and autoplay.

ENTER QUARTERBACK
NAME ATT YRDS %COMP TD
1 = THIESMAN 314
2 = WASHINGTON 1
ENTER NUMBER THEN
SELECT OFFENSIVE PLAY
1 = SWEEP TOP
2 = OFF TACKLE TOP
3 = SWEEP BOTTOM
4 = OFF TACKLE BOTTOM
5 = QB SNEAK
6 = QB FALL ON BALL
7 = FIELD GOAL
8 = PUNT
A = SHORT PASS
B = LONG PASS
C = FLAT PASS
ENTER PLAY NUMBER THEN PRESS (CR)
SELECT DEFENSE
LINEBACKER BLITZ
1 = TOP OLB KAUFMAN RR = 3 PR = 2
2 = TOP ILB/MLB OLKEWICZ RR = 3 PR = 3
3 = BOTTOM ILB
4 = BOTTOM OLB MILOT RR = 4 PR = 3
RUN KEYS
5 = BACK 1 BULAICH OR MAITLAND
6 = BACK 2 NOWATZKE OR HAVRILAK
SHORT YRD DEF PASS PREVENT DEF
7 = 6 MAN LINE 8 = 5TH DB NELMS
DOUBLE COVER
A = TE MACKEY OR MITCHELL
B = SE HINTON OR ORR
C = FL1 JEFFERSON OR PERKINS
D = FL2 PERKINS

All the statistics for 20 Super Bowl Teams!

Super Bowl Sunday®
by Quest, Inc.

microcomputer games DIVISION
The Avalon Hill Game Company
4517 HARFORD ROAD, BALTIMORE, MD 21214 • 301 254-9200

Available at:
Toys "R" Us/Lionel Kiddie City/Games and Gadgets/Electronic Boutique/Select **Software City Stores**/Select **K-Mart Stores**/Select **Sears Stores**/Select **Montgomery Ward Stores**/Select **Warehouse One Stores**/Select **Target Stores** and **BETTER GAME/COMPUTER STORES EVERYWHERE.**

CALL TOLL FREE 1-800-638-9292
FOR ORDERING INFORMATION.
ASK FOR OPERATOR 1

©1985 • Baltimore, MD • Printed in USA • All Rights Reserved
• Computer and Audio Visual Display Copyrighted

Do you have a question or a problem? Have you discovered something that could help other Commodore users? Do you have a comment about something you've read in COMPUTE!'s GAZETTE? We want to hear from you. Write to Gazette Feedback, COMPUTE!'s GAZETTE, P.O. Box 5406, Greensboro, NC 27403. We regret that due to the volume of mail received, we cannot respond individually to programming questions.

Strings And Names Of Strings

Books say that the 64 recognizes only the first two letters of a string. However, if I run these two programs, the first says the strings are the same, while the second says they're different. Why?

```
10 A$="ABCD":B$="ABCD"
20 IF A$=B$ THEN PRINT "SAME"
```

```
10 A$="ABCD":B$ ="ABC"
20 IF A$<>B$ THEN PRINT "NOT THE
   SAME"
```

G. L. Short

There's a difference between a thing and the name of a thing. You might say plums are purple or "plums" is a five-letter word, but you'd never say "plums" is a five-letter purple word.

When a 64 or any other computer compares two variables with equals (=) or not equals (<>), it's not comparing the names of the variables—the variable name A$ is always a different name than B$—it's comparing the values held in the two variables. In the first program, the values are the same; in the second they're different.

The two character limit applies to variable names. *THIS$ and THAT$ might seem to be different variables with different names, but the computer keeps track of the first two letters only. So, as a variable name, THIS$ is equivalent to THAT$ because they both begin with the letters TH.*

Formatting New Disks

My disk drive works perfectly with commercial programs, but when I try to save a simple three line program of my own, I get the error message FILE NOT FOUND. What am I doing wrong?

Wayne Shaw

New disks are not ready for saving or loading programs. Before you can read or write to a disk, you have to format it with the NEW command. Put the disk in the drive and enter this line:

```
OPEN 15,8,15,"N0:diskname,id"
```

or

```
OPEN 15,8,15
PRINT#15,"N0:diskname,id"
```

Make up a name for the disk, up to 16 characters long. The two-character ID should always be different than the IDs you give to other disks. As the disk is formatted, you may hear some knocking sounds, and the red light will turn on. Type **CLOSE 15** *and the light will eventually go out. Once the disk is formatted, it stays formatted, so you only need to do this once.*

Formatting erases everything from the disk, so don't use this command on commercial software (besides, the disks are already formatted). You can quickly reformat a formatted disk by leaving off the ID, but remember that everything will be erased.

Crunching Vs. Readability

When I program, I usually allot one command per line. When I list it, I can easily follow the program. Why are the programs in COMPUTE!'s GAZETTE crunched down? When a line contains several commands, it's much harder to read.

Stephen Paylor

Back when the VIC-20 first appeared, with its limited 3.5K of memory, one of the main reasons for crunching was to save memory. Each program line takes up five bytes for overhead, so combining six commands on one line saves a couple dozen bytes of memory. Old habits are hard to break; many VIC owners who upgraded to a 64 still put several statements on a single line. Crunched programs also run slightly faster.

Another advantage to crunching is that it allows you to see more of the program at the same time. A subroutine with 50 statements wouldn't fit on the screen if you only had one command per line. Combining lines saves some time, because you don't have to keep typing LIST. And when you list to a printer, a crunched program uses less paper.

In some cases crunching is the best way to handle an IF-THEN statement. Consider the following line:

```
590 IF A=15 THEN B$="DISK": TV=1
```

When the condition is not *true (A is not 15), the computer proceeds to the next line; it does not continue to the next command on the same line. In this case, if A equals 15, then two variables are assigned new values. By adding a colon and additional statements, you can make several things happen after an IF-THEN.*

Another important consideration from our point of view as publishers is magazine space. If we used one statement per program line, the listings would consume much more space in the magazine—which translates to fewer programs and articles.

The drawback, as you've noted, is that crunched programs are less readable. There are several reasons for crunching, but if readability is important to you, single-statement lines would be best when writing your own programs.

Scanning The Keyboard

Can you suggest a BASIC routine which would allow the computer to scan the keyboard for a specific key to be pressed? I know you can use a line like **10 GET A$: IF A$="" THEN 10**, but what if you want the program to continue running until a key is pressed? I know you could do it in machine language, but is it possible in BASIC?

Larry D. Dodgens

Commodore computers automatically scan the keyboard 60 times a second. If a key is pressed, its ASCII value is put into the keyboard buffer. GET takes a character out of the buffer; if no key has been pressed, GET will hold a null string.

You don't need to write a program to check the keyboard; the computer already takes care of it. This short program demonstrates:

```
10 GET A$: IF A$="A" THEN 30
20 PRINT "THE PROGRAM CONTIN-
   UES": GOTO 10
30 PRINT "THE A WAS PRESSED":END
```

In line 10, the character in A$ is a null string (zero characters long) as long as no key has been pressed, and the program continues in the simple loop until you press the letter A.

It's only the best.

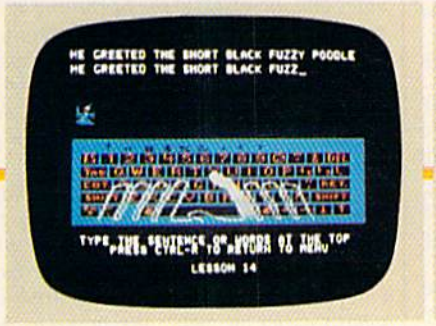
And we keep making it better. To learn to type and have fun doing it, ask for MasterType.™ Three years atop the best seller lists. Over 400,000 copies sold.

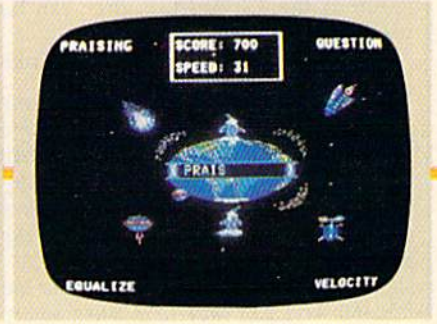
If you want to learn to type like a pro, MasterType knows how to motivate you—how to make the tedious challenging and the routine exciting.

New improved MasterType now features on-screen finger positioning, sentence typing practice, rhythm instruction and even more colorful, exciting graphics combined with all the fun of its fast-paced, arcade game action.

As MasterType takes you from the first steps, right up through eighteen levels of difficulty, to total typing mastery, you learn a serious skill almost without effort. It's the most complete program you can buy.

Here's just some of the praise MasterType has received:





Best Software of 1985
A+ Magazine

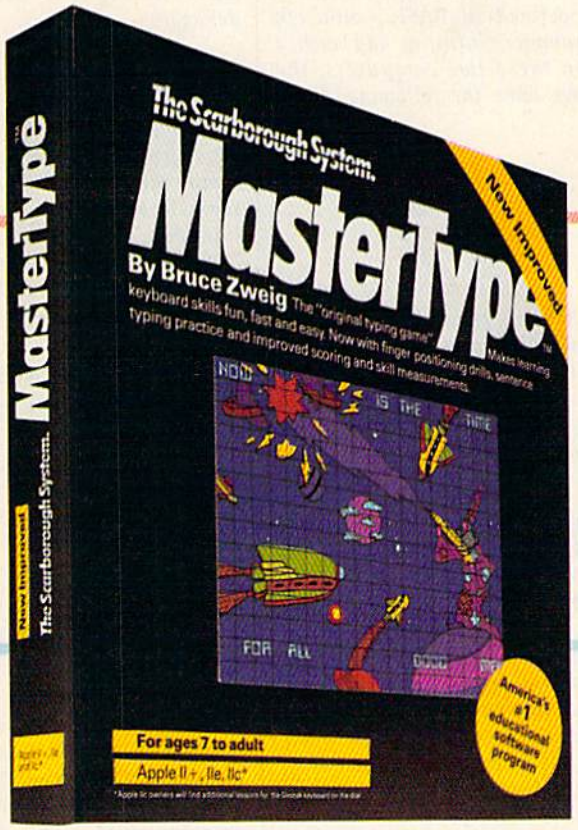
1985 Critics' Choice Award
Family Computing Magazine

"MasterType is an excellent buy. It takes an exciting approach to an old topic."
Electronic Learning Magazine

"MasterType is an excellent instructional typing game. We had fun reviewing it, and we highly recommend it..."
Infoworld Magazine

"It is hard to imagine a more clever way to teach touch typing."
Family Computing Magazine

And as you sharpen your typing skills, you're getting more familiar with your computer. By the time you've mastered MasterType, you'll use the computer as matter-of-factly as you dial the phone.



Available for: Apple II Family, Commodore 64/128, Commodore cartridge, Atari, Atari cartridge, IBM PC/XT/PCjr, Macintosh

The Scarborough System.

© 1985 Scarborough Systems, Inc., 55 South Broadway, Tarrytown, NY 10591 914-332-4545

Another way to do the same thing on a VIC or 64 is to use **PEEK(197)** *or* **PEEK(203)**, *which will hold a value of 64 if no key is being pressed. If a key is pressed, these memory locations will contain a number from 0–63, depending on the keyboard matrix (row and column of the key on the keyboard). These locations don't read CTRL, SHIFT, RESTORE, or the Commodore key.*

Can Function Keys Be Programmed?

Are the function keys unique in any respect? Is there a function they can be used for?

Curtis R. Finke

The newer Commodore computers—the 128, Plus/4, and 16—have programmable function keys. You can enter a line like **KEY7, "LIST-100:" + CHR$(13)** *to define f7. Thereafter, every time you press f7, "LIST-100:" will be printed, and the program lines through 100 will list. Assigning frequently used commands to the function keys can save time when you're programming.*

On the VIC and 64, the function keys cannot be defined in BASIC, although some programmer's utilities add such a feature. On these two computers, the function keys have the following ASCII values:

f1	*133*	*f2*	*137*
f3	*134*	*f4*	*138*
f5	*135*	*f6*	*139*
f7	*136*	*f8*	*140*

Note that they're not in numeric order. The first four are unshifted (odd numbers); the second four are shifted (even). You can have a program check to see if a function key has been pressed with a routine like this:

```
520 PRINT "PRESS F1 TO PLAY
    AGAIN, F2 TO END"
530 GET K$: IF K$="" THEN 530
540 IF K$=CHR$(133) GOTO 30
550 IF K$=CHR$(137) THEN END
```

As a substitute for CHR$(133), you can type a quotation mark, the f1 key, and another quotation mark. The function keys normally don't correspond to printable characters. But when the computer is in quote mode, pressing a function key returns a reverse character.

Restarting A Program

I cannot figure out how or when to use the CONT statement.

Andrew Gnoy

The CONTinue statement causes a program to start up again after it's been stopped. You might call it a close relative of RUN and GOTO.

When you run a BASIC program, all variables are cleared and the computer starts working at the lowest numbered line in the program. You can add a line number if you wish, RUN 200 for example, to skip over the first part of the program. Either way, all variables are erased.

GOTO is most often used inside a program to change the program flow. But it can also be used in direct mode to start up a program. GOTO does not affect variable values, which makes it valuable in testing a routine. You define some variables and then GOTO the beginning of the routine, to see if it's working correctly.

Like RUN and GOTO, CONT causes a program to run. But it always restarts a program that has been stopped for some reason; you never start up a program for the first time with CONT.

In BASIC, STOP and END can make a program stop running. Pressing the STOP key does the same. While the program is stopped, you can print out variable values or LIST a line to find out what's going on inside the program. The technique of stopping a program and then CONTinuing it is most often used in debugging.

You can't use CONT if an error has stopped the program. And if you change a line (or even just press RETURN over a line), variables are cleared and CONT won't work. The 128 presents an exception to these rules: Variables are kept in a separate bank of memory, so entering a line doesn't clear them. And the 128 has a RESUME command that allows you to continue after an error has occurred.

Stymied By Error Messages

Could you please help me with these error messages?

```
UNDEF'D STATEMENT
OUT OF MEMORY
NEXT WITHOUT FOR
BAD SUBSCRIPT
ILLEGAL QUANTITY
```

I retyped all the lines that had an error and they still came up with the same messages.

Kim Spain

When the computer says there's an error, the line number listed is not necessarily the one causing the problem. For example, **1010 GOTO 1125** *should send the program to line 1125. But if you've forgotten to include a line 1125, the program can't go there; it stays at line 1010 and prints "UNDEF'D STATEMENT ERROR IN 1010." Line 1010 is typed correctly; the problem is that line 1125 is missing.*

NEXT WITHOUT FOR means there's a mistake in the logical flow of the program. A FOR-NEXT loop needs a FOR at the beginning and a NEXT at the end. A NEXT by itself doesn't make sense—the program can't finish a loop that hasn't begun. If you're typing in a program from a magazine or book, check back a few lines to find the FOR that starts the loop.

If you're writing your own program, check to see that the loops are nested properly. When you put one loop inside another, the FOR and the NEXT of the inner loop have to be completely within the bounds of the outer loop. In other words, the first nested loop to begin has to be the last to end.

OUT OF MEMORY sometimes happens when you don't have enough memory for the program and variables, especially if you're working with an unexpanded VIC or trying to write a long hires graphics program on a Commodore 16. But most often it's a result of jumping out of a FOR-NEXT loop or exiting a subroutine with a GOTO rather than a RETURN. (See "Don't Jump out of Loops" in the September 1985 Gazette Feedback for more about this error.)

The next error, BAD SUBSCRIPT, means there are problems with an array variable like A(5), BR(J), T$(15), or A4%(Z)—a variable name followed by a number or expression in parentheses. An array should be dimensioned with the DIM statement before you use it for the first time. **DIM A(24)** *makes the computer establish an array called A that has 25 elements, numbered 0–24. An array is like a numbered list of variables.*

If you use DIM A(24) and then try to read or write a value with A(30), the subscript—the number in parentheses—is too large and you'll get the error message. It could also occur if you accidentally assign the value 600 to variable J and then try to do something with A(J). When J is equal to 600, A(J) is the same as A(600), which is a bad subscript (unless you've dimensioned the array to a size of 600 or greater). When this error happens, check for a missing DIM or a subscript that's too large. If you don't dimension an array, it defaults to 11 elements numbered 0–10.

There are several situations that can cause an ILLEGAL QUANTITY error. Generally, this results if you're trying to place a number that's too large or too small in a function or command. For example, there's no such thing as the logarithm of zero, so **PRINT LOG(0)** *yields this error message.*

One of the most common causes of an ILLEGAL QUANTITY error is trying to POKE a number larger than 255 into memory. Say you forgot to type a comma in a list of DATA statements:

```
10 FOR J=49152 TO 50000: READA:
   POKEJ,A: NEXT
513 DATA 169,10,133 16,255,13
```

It's legal to have numbers of any size in DATA statements, but POKEs to memory have to be in the range 0–255. In this case, line 10 reads the third number as 13316, which is much too large to be

SCENERY DISKS *for* FLIGHT SIMULATOR II

SubLOGIC Scenery Disks expand the potential flying environment of Flight Simulator II and Microsoft Flight Simulator.

Twelve separate Scenery Disks cover the entire continental United States. Each disk covers a geographical region of the country, and includes the major airports, radio-nav aids, cities, highways, rivers, and lakes located in that region. Enough detail is available on each disk for either visual or instrument cross-country navigation.

A STAR Scenery Disk (available 4th quarter 1985) covers a smaller area with a relatively dense amount of scenery. STAR Scenery Disks are primarily intended for visual flight sight-seeing. They include buildings and landmarks, as well as detailed renditions of all major airports in the area.

Individual Scenery Disk price: $19.95
Western U.S. (Disks 1-6): $99.95
– Coming Soon –
Eastern U.S. (Disks 7-12): $99.95

See Your Dealer . . .
or write or call for more information. For direct orders please specify which disk or disk-set you want. Enclose the correct amount plus $2.00 for shipping ($6.00 for the six-disk set) and specify UPS or first class mail delivery. Visa, MasterCard, American Express, and Diners Club cards accepted.

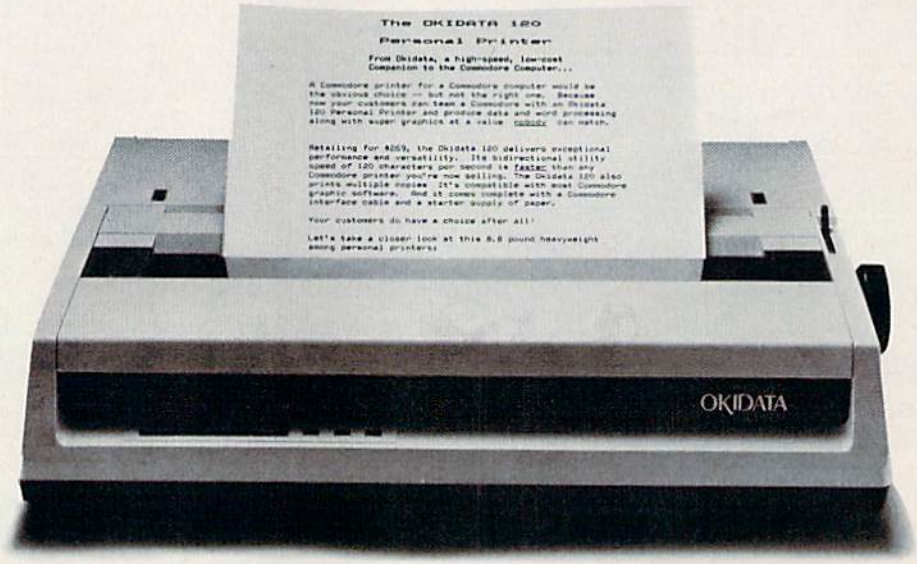
Commodore 64 is a trademark of Commodore Electronics Ltd.
IBM is a registered trademark of International Business Machines Corp.

For the Commodore 64™ and IBM PC®

subLOGIC Corporation
713 Edgebrook Drive
Champaign IL 61820
(217) 359-8482 Telex: 206995

Order Line: (800) 637-4983
(except in Illinois, Alaska, and Hawaii)

Left Brain.



Rational. Functional. Precise.
Introducing the OKIDATA 120, the logical printer for your Commodore® computer.

Get results fast. With a utility mode that zips through letters and reports at twice the speed of any Commodore printer.

Switch to the enhanced mode. And print your most important ideas with typewriter clarity. Or illustrate your rationale with the 120's bit image graphics for high resolution charts, graphs and drawings.

Stay on target. With a self-inking "Clean Hands" ribbon cartridge. And Okidata's famous full year warranty on parts, labor and printhead.

The OKIDATA 120. At $269*, it's the only Commodore-compatible printer that makes sense.

For more information, call 1-800-OKIDATA (in New Jersey 609-235-2600). Mt. Laurel, NJ 08054.

Get the OKIDATA 120 at these fine stores:

Advantage Computer Accessories (Canada)
Childworld/Children's Palace
Consumers Distributing
David Weis
Electronics Boutique/ Games & Gadgets
Federated
Fred Meyer
Lionel/Kiddie City/ Lionel Playworld
Montgomery Ward (at participating stores)
S.E. Nichols
Service Merchandise
Toys 'R Us

MS-8348

OKIDATA®
an OKI AMERICA company
We put business on paper.

Commodore is a registered trademark of Commodore Business Machines, Inc.
OKIDATA is a registered trademark of OKI AMERICA, INC.
*Manufacturer's suggested retail price.

Right Brain.

Effervescent. Colorful. Outrageous.
Meet the OKIMATE 10, the $208* color printer that takes your Atari® or Commodore® computer over the rainbow!

Dazzle 'em. With brilliant printing in over 36 eye-tickling colors. Reds, greens, golds and blues that breathe life into everything: from charts and graphs to original drawings and overhead transparencies.

And when you're forced to work in black and white, the OKIMATE 10 prints crisp, clean reports and papers—at 240 words per minute. You can even add spice with wide, bold and fine print.

Everything you need for color printing comes with the OKIMATE 10 and its Plug 'n Print package. Including a data cable, Learn to Print and Color Screen Print software diskettes, a color ribbon cartridge, a black ribbon cartridge and paper.

So c'mon, print on the wild side. With the OKIMATE 10 Personal Color Printer from Okidata.

For more information, call 1-800-OKIDATA (in New Jersey 609-235-2600). Mt. Laurel, NJ 08054.

OKIDATA®
an OKI AMERICA company

We put business on paper.

*Manufacturer's suggested retail price. Atari is a registered trademark of Atari, Inc.
Commodore is a registered trademark of Commodore Business Machines, Inc.
OKIDATA is a registered trademark of OKI AMERICA, INC.
OKIMATE and Plug 'n Print are trademarks of OKI AMERICA, INC.
To run Plug 'n Print software, the Commodore 64, 128 and PLUS 4 require disk drive.
Atari requires disk drive and a 48K memory.

Buy Now!
$15 Manufacturer's rebate on OKIMATE 10.

Offer good from October 1, 1985 through January 31, 1986. See the following participating stores for details.

Advantage Computer Accessories (Canada)
Arthur's Jewelers
Best Catalog Showrooms
Brendle's
Caldor
Childworld/Children's Palace
Consumers Distributing
Crazy Eddie
David Weis
Dolgins Catalog Showrooms
Electronic Boutique/ Games & Gadgets
Ellman's
Evans
Federated
Fred Meyer
Fred P. Gattas
G.C. Murphy/Murphy Mart
G.I. Joe
Great Western Catalog Showrooms
J. Triesman
Jafco Catalog Showrooms
LaBelles Catalog Showrooms
Lionel/Kiddie City/ Lionel Playworld
McDade
Meijers (Michigan only)
Montgomery Ward (at participating stores)
Prange
S.E. Nichols
Save-Rite
Sears, Roebuck & Co. (at participating stores)
Service Merchandise
Stereo Village
Stokes
Toys 'R Us
Videoland
Witmark
Wizards Electronics
Zayre

POKEd into memory. The READ works fine, it's the POKE that fails. The error message reports that line 10 is wrong, even though 513 has the missing comma.

When the computer reports an illegal quantity, list the line. If there's a READ followed by a POKE in the line, type **PRINT PEEK(63) + 256 * PEEK(64)** *to find out which line of DATA contains the problem.*

No VIC Support?

I just inherited a VIC-20 with a Datassette and 16K expander. I found out that Commodore has discontinued the VIC, and I can't find any software at all. Can you help?

Steve Zabuska

You'll have to look very hard to find software for the VIC. Commodore stopped producing VIC software last year, as did almost all third-party publishers. Some mail-order companies still have VIC software at closeout prices.

We can suggest two other sources that can help. Various Commodore user groups have VIC enthusiasts, and some of these groups have a sizable library of VIC public domain programs. The second source is COMPUTE!'s GAZETTE, *which has published software for the VIC since the first issue, in July 1983, and continues to do so. Although we've reduced our VIC coverage to provide more coverage of the newer Commodore machines, there are hundreds of type-in programs in past issues, many of which are still available. And the* GAZETTE DISK, *started in May 1984, has included many ready-to-run VIC programs in each of its issues. All back issues of the* GAZETTE DISK *are available.*

Relative Files

In the June article on relative files, you say to add 96 to the channel number when the pointer is positioned. Why is this done?

Peter Rushie

Earlier editions of the 1541 User's Manual *used the channel number by itself, while newer manuals say you should add 96. We called Commodore and one of their technical staff said that Commodore programmers have found that adding 96 makes relative files work more reliably. Our experience is that relative files work with or without the 96. But since Commodore recommends the 96, it's probably a good idea to use it.*

On another note, several readers have asked if disk validation destroys relative files. The answer is no, validation won't harm relative files. The validate command takes relative files into account when it cleans up the block allocation map.

Typewriter Emulation

I am having problems writing a "typewriter" program. I'd like to press a key and have it print on the printer. But the printer moves to the next line after every letter. Can you help?

Gary Thomas

Your program probably looks something like this:

```
10 OPEN 4,4,7
20 GET A$: IFA$=""THEN 20
30 PRINT#4,A$:GOTO20
```

Both PRINT and PRINT# add a carriage return, which is why you're seeing only one character per line. You could add a semicolon between A$ and the colon in line 30, but that would lead to another problem. Printers generally save characters sent to them in a buffer until they receive a carriage return. You would be typing blindly until you pressed RETURN (which would make the letters print all at once). Try changing line 20:

```
20 INPUT A$
```

As you type, you'll see the letters on the screen. Pressing RETURN causes the line to print. The letters don't print one by one, so it's not quite a typewriter, but it's a workable solution.

Hexadecimal Conversions

Is there an easy way to convert decimal numbers into hex? I have looked at several books about this, but don't understand how to do it.

Evan Unsell

Another name for decimal, the numbering system we use, is base ten. *Decimal numbers include only the ten digits 0–9. For larger numbers, the digits are multiplied by powers of 10 (10, 100, 1000, and so on). The number 365 expands out to (3×100) + (6×10) + (5), for example.*

Hexadecimal, base 16, is often used to represent quantities in machine language programs, for the sake of convenience. The sixteen digits are 0–F. The numbers 0–9 are followed by A–F (there isn't a single digit for the decimal value 10, so in hex, A is worth 10, B is 11, up to F, which is 15). Numbers larger than 15 (hex F) are multiplied by powers of 16 (decimal 16, 256, 4096, and 65536). A dollar sign ($) is commonly used to mark hex numbers. The number $2A7 is decimal 679: (2×256) + (10×16) + (7) = 679.

Here's a short conversion routine for translating decimal to hex. It works on all Commodore computers (although on the 128 and Plus/4, it's easier to use BASIC's DEC(X) and HEX$(X) functions).

```
10 HX$=""
20 INPUT"DECIMAL";D
30 T=((D/16)-INT(D/16))*16:HX$
   =CHR$(T+48-(T>9)*7)+HX$:D=(
   D-T)/16:IFDTHEN30
40 PRINT"HEX: ";HX$:GOTO10
```

To go the other way, from hex to decimal, use these lines:

```
10 D=0
20 INPUT"HEX";HX$
30 FORJ=1TOLEN(HX$):M$=MID$(HX
   $,J,1):D=D*16+ASC(M$)-48+(M
   $>="A")*7:NEXT
40 PRINT"DECIMAL: ";D:GOTO10
```

Neither routine has any error-checking. Make sure you enter only positive numbers in the first program. And input in the second program should be limited to numbers 0–9 and letters A–F.

Scrambling A List

How can a selection of, say, ten random numbers be printed to the screen or printer without repeating a number in the selected range? The RND command sometimes repeats a number.

John G. Walker

The random number function RND wouldn't be random if it didn't repeat occasionally.

Consider a random event like flipping a coin. You have a 50/50 chance of seeing heads or tails. But if the first toss is heads, that doesn't mean the second toss has to be tails. The second time the coin is flipped, it again has a 50/50 chance of being heads or tails. So it's possible for a coin to be heads any number of times in a row. The same goes for dice or other random number generators. There's always a chance of repeating.

Now think about shuffling cards. If the first card drawn is a three of diamonds, you know the second card can't possibly be a three of diamonds. This method of randomizing doesn't repeat like coins or dice would. One answer, then, is to create a list of numbers and shuffle them around randomly, like a deck of cards. The following program creates an array of 20 numbers (initially in order) and trades the numbers around. It then prints the first five. This general shuffling routine could be modified for card games, bingo, or even picking a lottery number.

```
10 DIM A%(20): R=RND(-TI/101)
20 FOR J=1 TO 20: A%(J)=J: NEXT
30 FOR J=1 TO 5: FOR K=1 TO 20:
   L=A%(INT(RND(1)*20+1))
40 TEMP=A%(K): A%(K)=A%(L):
   A%(L)=TEMP
50 NEXT K,J
60 FOR J=1 TO 5:PRINT A%(J):NEXT
```

A One-Way Street

Could I use the video out jack on my VCR to send a screen or other information to my 64?

Steve Schindler

With the right cable, you can record the video signal from your 64 on a VCR. But it's a one-way connection: You can't send signals from a videotape to a 64 without a

COMPUTE!'S GAZETTE FOR CHRISTMAS.

Give a gift subscription to *Compute!'s Gazette* and you'll be giving a lot more than just another computer magazine. That's because *Compute!'s Gazette* comes complete with over 20 FREE programs in each big issue.

Send *Compute!'s Gazette* today and your gift recipient can depend on a steady supply of high quality fun-filled programs for their Commodore VIC-20 or 64's—like Number Quest, Address File, Treasure Hunt, Castle Dungeon, Vocab Builder, SpeedScript and hundreds of other educational, home finance and game programs the entire family can use all year long.

The free programs alone are worth much more than the low holiday gift subscription price. But there's much more to *Compute!'s Gazette* than just free programs.

Compute!'s Gazette's superb editorial delivers the latest inside word on everything from printers to interfaces...joy sticks to disc drives. And our up-to-the-minute software reviews are "must reading" for any Commodore VIC-20 or 64 home user.

So whether that "certain someone" is a novice or an experienced user, *Compute!'s Gazette* makes a great stocking stuffer. Especially when you can give twelve big issues for just $24... that's 32% off the cover price ...less than 10¢ per program.

Compute!'s Gazette. It's the perfect holiday gift. Give a subscription today by returning the attached subscription card...or by calling 1-800-247-GIFT.

COMPUTE!'s GAZETTE MAGAZINE

STUFF THEIR STOCKINGS WITH HUNDREDS OF NEW PROGRAMS FOR JUST PENNIES APIECE...

WITH A GIFT SUBSCRIPTION TO COMPUTE!'S GAZETTE.

To Order, Call Toll-Free 1-800-247-GIFT

In Iowa Call 1-800-532-1272

M1616

Where to find and buy The Halley Project.

National
Available at all Child World and Children's Palace Stores
Federated Group
Sears — Most larger stores
Waldenbooks — Most locations

Alabama
Software City
Huntsville
The Computer Shoppe
Huntsville

Alaska
Computer Express
Fairbanks

Arkansas
The Computer Shoppe
Little Rock

California
Access to Software
San Francisco
Affordable Computer Systems
Santa Clara and San Jose
Alamo Computer Center
Cupertino
Alamo Electronic Components
San Jose
Applied Computer Skills
Van Nuys
B. Dalton Software Etc.
Concord, San Diego, Bakersfield, Torrance, Montclair, Northridge
Books & Bytes
Cypress
Boot's Camera Electronics
Fresno
Border Software
Chulavista
Brown Knows Computer
Redlands
Candy Computer
Elk Grove
Computer Outlet
San Diego
Computermart
Diamond Bar
Computertime
Citrus Hts.
Corporate Micro Services
San Francisco
Crown Book & Software
Los Angeles, Santa Monica, Marina Del Rey, Studio City, Santa Ana, Redondo Beach, Hollywood, Glendale, Culver City, South Pasadena, Thousand Oaks, Torrance, Huntington Beach, Downey, Sherman Oaks, Encino, El Toro, Long Beach, Palos Verdes, Northbridge, Pasadena, Westminster, Woodland Hills, Ventura, Lakewood
Egghead Software
Lawndale, Pasadena, Orange, Sherman Oaks, San Diego
Family Discount Computer
Escondido
Future Vision
San Louis Obispo
Futurvision
Napa
H.T. Electronic, Inc.
Sunnyvale
Home Computing Centers
San Bruno, San Leandro
Learning Tree Computer
Santa Ana
Software Centre Int'l
Costa Mesa, Santa Ana
Software Shoppe
Huntington Beach
Software First
San Rafael and Santa Rosa
Software Galeria
Orange
Software House
Fresno
Software Service Center
Tustin
Software Solution
Chico
Software Solutions
El Cerrito
Software Station
Costa Mesa
Software Supermarket
Lawndale, Los Angeles, Sherman Oaks
Software World
Redding
Software, Etc.
Novato
Sysware
San Diego

Colorado
Citadel Computer
Colorado Springs
Colborn School Supply Co.
Denver
Colorado Computer Systems
Westminster

Colorado (cont)
DMA Computer Solutions
Colorado Springs
Kazoo & Company
Denver
Software Center
Concord

Connecticut
Caldor
West Norwalk, Old Saybrook, Enfield, Milford, W. Hartford, Vernon, Riverside, Norwalk, Brookfield, Trumbull, Mansfield, Norwich, Hamden, Waterbury, Manchester, Stamford, Wallingford, Avon, Rocky Hill, Ridgefield, Torrington, Branford, Bristol, Meddletown, Fairfield, Groton, New Britain, Derby, Southington
Crazy Eddie
Norwalk
Danbury Video & Computer
Danbury
Derric Electronics
Hamden
Kiddytown
Norwalk
Personal Computer Center
Norwich
Petzold's
Seymour
Softown, Inc.
Danbury
Software City
Stamford, Orange
Software Kingdom
E. Hartford, E. Windsor
Video Connection
Bridgeport

Delaware
Software Kingdom
Dover

District of Columbia
Crown Book & Software
(3 locations)

Florida
Computer Chip
Sarasota
Computer Generation
Plantation
Computers, Etc.
Lakeland
Discount Disks
Shalimar
Florida Micro Media
Pompano Beach
Games 'N Gadgets
Clearwater, Jacksonville, Tallahassee, Orange Park
Maxicat
Miami
Program Store
Clearwater, Pinellas Park
Software Cellar
Fort Lauderdale
Software Shops
Brandon

Georgia
Academic Software
Roswell
Alpha Information Systems
Fayetteville
Cardinal Computers
Dalton
Electronics Boutique
Atlanta — Lenox Square, Cumberland Mall
Games 'N Gadgets
Atlanta — North Lake Mall, Perimeter Mall
Software Atlanta
Atlanta (2 locations)
Software City
Atlanta
Versatile Video
Atlanta and Roswell

Hawaii
Software Library
Honolulu

Idaho
Software Galeria
Idaho Falls
Stokes Brothers, Inc.
Boise

Illinois
ABC Diskette
Chicago
Asoftware Store
Oaklawn
Apprat Computers
Arlington Heights
B. Dalton Software Etc.
Chicago
C02 Enterprises
Chicago
Complete Computing
Lombard
Computer Outpost
Schaumburg

Illinois (cont)
ComputerLand
Niles
Computerworld
Chicago
Crown Book & Software
Orland Park, Niles, Wheaton, Evanston, Oaklawn, Oak Park, Chicago, Skokie, Deerfield, Downers Grove, Highland Park, Naperville, Hoffman Estates, Arlington Heights, Calumet City
Disk-N-Tech
Orland Park
F.D. Software & C.A.D.S.
Roselle
Family Software
Glendale Heights
Software and Beyond
Schaumburg
Software City
Arlington Heights
Software Plus West
Hanover Park
Susie Software
Mount Prospect

Indiana
B. Dalton Software Etc.
Indianapolis
Burkat Computer Center
South Bend
Computer Corner
Merrillville
Microcomputer, Inc.
Indianapolis

Kentucky
Software Source
Louisville
The Computer Shoppe
Louisville (2 locations)
Videovisions
Louisville

Louisiana
B. Dalton Software Etc.
New Orleans
PFL Computer Center
Monroe
Software Mart
Metairie

Maryland
Buried Treasure
Rockville
Caldor
Timonium, Baltimore, Severna Park, Ellicott City
Crown Book & Software
Wheaton, Columbia, Laurel, Kensington, Silver Springs, Bowie, Bethesda, Greenbelt, Gaithersburg, Annapolis, Rockville
Electronics Boutique
Baltimore
Games 'N Gadgets
Columbia, Baltimore (White Marsh Mall, Security Square Mall, Eastern Ave.)
Greetings and Readings
Towson

Massachusetts
Atlantic Computers
Waltham
Barnes & Noble Bookstore
Boston
Caldor
Chelmsford, Westborough, Swansea, Pembroke, Westfield, Auburn, Malden, Norwell, Brockton, Canton, Brighton, Taunton, Salem, Chicopee, Stoneham, Springfield, Framingham, Northampton, Worcester, Weymouth, Saugus, Methuen, Burlington
Computer Concepts
Hanover
Computer, Etc.
Peabody
Electronic Boutique
Holyoke
Softpro
Burlington
Software City
West Springfield
Software Galeria
Boston
The Whiz
Westboro

Michigan
Micro-World
Livonia and Milford
Vor-Tech Computer Center
Pontiac

Minnesota
B. Dalton Software Etc.
Brooklyn Park, Minnetonka, Roseville, Edina, Minneapolis

Missouri
Forsyth Computers
St. Louis

Missouri (cont)
Software To Go
St. Louis and Clayton

Montana
Colborn School Supply Co.
Billings

Nevada
Century 23
Las Vegas
Computer House
Sparks
Computer-Video-Electronic
Carson City
Software City
Las Vegas

New Hampshire
Caldor
Bedford
Micon Computer
Londenderry
Neba Computer
Plaistow
Portsmouth Computer Center
Portsmouth
Soft Spot
Manchester

New Jersey
Bamberger's
Menlo Park, Cherry Hill, Paramus, Livingston, Wayne
Caldor
Eatontown, S. Plainfield, West Orange, Toms River, Watchung, Paramus, Morris Plain, Woodbridge, Brick Town, N. Brunswick, W. Paterson
CIA
S. Plainfield
Circuit Services
Newton
Computer Pro's
Wayne
Computer Software
Ocean
Crazy Eddie
Paramus, E. Brunswick, Union, Totawa, Woodbridge
Disk-of-the-Month Club
Fair Lawn
Electronics Boutique
Voohrhees, Rockaway, Woodbridge
Family Computer Centres
Fairfield, South Orange
Games 'N Gadgets
Livingston, Burlington, Wayne
Gemini Enterprises
Cedar Knolls
Golden Hedge Inc.
Cherry Hill
Igor Software
Teaneck
Kearny Electronics
Kearny
Prince Range
Livingston
Program Store
Eatontown and Wayne
Softec
Newton
Software City
Redbank, Linwood, Ridgefield, Summit, Teaneck, Bergenfield, Parsippany, Linwood
Software Spectrum
North Plainfield
Software Station
Morristown and Rockaway
Video Dynamics
Ridgewood
Videomania/Computers Plus
Bloomfield
Village Computer Center
Cedar Knolls
Wayne Software
Wayne
Wolsten's Inc.
East Orange

New Mexico
Academy Computer
Albuquerque
B. Dalton Software Etc.
Albuquerque
Colborn School Supply Co.
Albuquerque

New York
17 Software Street
Vailsgate
45th Electro
New York
47th St. Photo, Inc.
New York (3 locations)
Advanced Camera
New York
Annex Outlet
New York
Barnes & Noble Bookstore
New York (2 locations)

New York (cont)
B. Dalton Software Etc.
Yonkers and New York
Big L Electronics
W. Hempstead, W. Babylon, Syosset, New Hyde Park, Patchogue
Binary Orchard Inc.
Hamburg, West Seneca
Broadway Computers
New York
Byte Shop
Merrick
Caldor
Lake Ronkonk, East Patchogue, Wappingers Falls, Riverhead, Rocky Point, Bridgehampton, Vails Gate, Glens Falls, Kingston, Middletown, Latham, Mahopac, Bedford Hills, Albany, Yorktown Heights, Peekskill, Pelham Manor, Schenectady, Nanuet, White Plains, Yonkers, Newburgh, Port Chester, Poughkeepsie, W. Babylon, Levittown, Coram, Clifton Park
CIA Software
Flushing
Computer Discount of America
Huntington
Computer Software Plus
Brooklyn
Computer Tech.
Brooklyn
Computerware
East Meadow
Computerworld
Bayshore
Crazy Eddie
Nesconset, Mass, New York, Syosset, Elmhurst, Brooklyn, Carle Place, Hartsdale, Bronx, Nanuet
East 33rd Typewriter
New York
Electronic Man
New York
Electronics Boutique
Albany
Executive Photo & Supply
New York
Focus Electronic
Brooklyn (2 locations)
Four Guys
New York
Games 'N Gadgets
Garden City, Huntington, Nanuet
Glossy Photo
New York
Great American Software
Flushing
Home Software
Albany
Intercontinental
Flushing
Island Video & Computer
Coram
J&R Computer Outlet
New York
J&S Electronic
New York
Leigh's Computers, Inc.
New York
Lloyd's
New York
Lloyd Corner
New York
London Luggage
New York
Micro Co.
New York
Micro Electronics
Valley Stream
Montgomery Grant
New York
Park Avenue Video
New York
Photo Sound
New York
Programs Plus
Brentwood
Quartz Electronics
New York
Quo Vadis
Ridgewood
Show & Tell Video
Bayshore
Softwaire Centre
Forest Hills
Software City
Mount Kisco, Syracuse, Wappinger Falls, Brooklyn, Flushing, Tonawanda, Spring Valley
Software Link
White Plains
Software Seller
Harrison
Staten Island Software
Staten Island
Sysut-I, Inc.
Brooklyn
Thruway Market
Walden

New York (cont)
Wall Street Camera
New York
Willoughby's
New York
World Trade
Bayside

North Carolina
Byte Shop
Greensboro
Games 'N Gadgets
Raleigh
Oasis Software
Wilmington

North Dakota
Colborn School Supply Co.
Grand Forks
Software House
Fargo

Ohio
Abby's Software
Fairborn
B. Dalton Software Etc.
Columbus
Big Bytes Computers
Poland
Computers Plus of Ohio
Mansfield
Disk Drive
Toledo
Electronic Connexion
Kettering
Electronic One
Columbus
Games 'N Gadgets
N. Randall
Magic One Computer
Barberton
Microwave Magic
Fairfield
North Coast Programming
Willoughby and Solon
Program Store
Columbus
Software and More
Cincinnati
Software City
Columbus
Swallens
Cincinnati
Sylvan Enterprises
Cincinnati
Video Computer World
Oregon
Video H.O.
Cleveland

Oklahoma
Computer Software Center
Oklahoma City
Home Software
Tulsa and Oklahoma City
Videocomp
Lawton

Oregon
At Computers
Klamath Falls
Egghead Software
Beaverton
Link Three, Inc.
Beaverton
Software Galeria
Beaverton

Pennsylvania
B. Dalton Software
Monroeville
Bamberger's
Whitehall, King of Prussia
Black Sun
Emmause
De Re Computers
Harrisburg
Electronics Boutique
Langhorne, King of Prussia, Whitehall, Exton
Floppy Disk
Mechanicsburg
Games 'N Gadgets
Lancaster, West Mifflin, King of Prussia, Media, Philadelphia

Rhode Island
Caldor
Woonsocket, Warwick, Lincoln
Future Images
Woonsocket
Software Connections
Warwick

South Carolina
Horizon Commodore Super Store
Greenville (2 locations)
Software Solutions
Charleston

Tennessee
Games 'N Gadgets
Memphis

South Carolina (cont)
Inacomp
Brentwood
Software Store
Memphis
The Computer Shoppe
Nashville, Knoxville, Memphis, Chattanooga, Madison

Texas
B. Dalton Software Etc.
Houston
Babbages
Dallas, Houston, Plano, Mesquite, Fort Worth, Irving, Hurst
Casa Computer
Lubbock
Compurite
Houston (2 locations)
Computer City
San Antonio
Computer Experience
San Antonio
The Computer Store
San Angelo
Data Pro Computer Center
Wichita Falls
Edu-Tron
Fort Worth
Floppy Wizard
Houston
Frisco Electronics
San Antonio, Austin
Home Software
Friendswood
National Video Austin
Austin (4 locations)
Software & Things
Austin
Software Store
San Antonio
Videoland
All locations

Utah
Software Center
Salt Lake City
Software Hut
Salt Lake City
Stokes Brothers, Inc.
Salt Lake City, West Valley, Orem, Ogden, Layton

Virginia
Computer Works
Petersburg
Crown Book & Software
Alexandria, Woodbridge, Reston, Springfield, Vienna, Manassas, Mclean, Falls Church, Fairfax
Family Computer Center
Fairfax
Games 'N Gadgets
Hampton, Virginia Beach
L&Y Electronics
Woodbridge
Next Generation Computer
Williamsburg
Program Store
Falls Church
Software Central.
Norfolk
Software Mart
Springfield
Softwarecenter, Inc.
Vienna
University Bookstore
Blacksburg

Washington
Butler's T.V. and Computer Service
Federal Way
Egghead Software
Tukwila, Bellevue
Nibbles and Bites
Tacoma

Wisconsin
Computer Software Center
Milwaukee
Computer Warehouse
Milwaukee
Romeyn Software
Janesville
Software Source
Brookfield
TMW Software
Wausau

Wyoming
Colborn's of Wyoming
Casper

Canada
Compusoftware
Vancouver, BC

Note: Not all formats available at all locations.

If there isn't a dealer listed in your area, don't give up.
Give us a call. Phone 1-800-221-9884. In Illinois 1-800-942-7315.

MINDSCAPE

Just tell your friends you're going on a very long trip.

TOP SECRET

Kiss your earthbound buddies goodbye and travel the solar system in the most exciting space program ever envisioned.

The Halley Project: A Mission In Our Solar System™ is history's first real-time space simulation. Its challenge provides out-of-this-world stimulation.

Lightweight space jockeys need not apply, this one's for qualified star pilots. A rigorous ten-mission training program will test your knowledge and skill as you navigate by the stars from planet to planet.

Complete all ten missions and be invited to face the ultimate challenge: the incredible secret eleventh mission.

So take off to a software dealer and join an elite group of space explorers. As for your chums, tell them you'll wave as you fly over.

Mindscape

Software that challenges the mind.

The Halley Project is available on: Apple,® Atari® and Commodore.®

Mindscape, Inc. 3444 Dundee Road, Northbrook, Illinois 60062, 1-800-221-9884 (In Illinois 1-800-942-7315)

Copyright © 1985, Mindscape, Inc. All Rights Reserved. Apple, Atari, and Commodore are registered trademarks of Apple Computer, Atari Inc., and Commodore Business Machines.

special kind of interface called a digitizer.

A computer is digital; it works in ones and zeros. There are no in-between states: Bits in memory can't be 1/2 or 3/4 on. TVs and VCRs, on the other hand, work with analog signals. To translate digital memory to analog TV, a 64 contains a radio frequency (RF) modulator, which is basically a miniature low-power television station that outputs a TV-compatible signal. Since the output works with televisions, it can be diverted to a VCR to be recorded. You could create title screens for a home videotape, for example.

A digitizer works the other way. It takes an analog signal and converts it to the ones and zeros used by the computer. See the June "Horizons" column for a review of a product that creates hi-res pictures from TV input, using the signal from a camera or videotape.

Moving ML Programs In Memory

"Screen-40" from the June GAZETTE was a welcome addition to my collection of VIC programs. However, it does consume about 7K of available BASIC memory. With full memory expansion and a machine language monitor, I tried to move it out of BASIC into block 5. But the VIC locks up. Do you have any suggestions?

Delmer Wohlgemuth

Two barriers must be overcome before you can move the program up to block 5. Unfortunately, one of the barriers is insurmountable.

The first barrier is the way machine language (ML) handles jumps. The instructions JMP and JSR are similar to BASIC's GOTO and GOSUB. They're followed by a two-byte address. If an ML program contains any JMPs or JSRs, you can't relocate it to another section of memory without also changing the addresses of the jumps. It would be like renumbering a BASIC program without changing the line numbers after the GOTOs and GOSUBs. In addition, there may be load or store instructions that use memory within the program area. They too would have to be modified.

Even if you successfully alter the program and put it up in block 5, there's a hardware limitation that will prevent Screen-40 from working. The program simulates 40 columns via a high-resolution screen. Since the VIC does not have a true hi-res mode, hi-res is simulated with double height custom characters. And the video chip only allows you to put custom characters into memory at 4096–8192. So approximately 4K would have to remain where it is.

It's possible to rewrite the ML part of the program to move it higher in memory, but the hi-res part would have to stay where it is (between 4096 and 8192).

Sprites Can Interfere With Files

I've run into a puzzling situation recently. I'm writing a 64 program that uses relative files and sprites. On an entirely random basis, the program would lock up. The solution was to turn off the sprites while accessing the relative file, then turning them back on after the file was retrieved. Why would sprites interfere with reading disk files?

Dennis Smith

Sprites can cause difficulties with disk and tape access. Always turn sprites off before reading or writing files.

Here's why: The 6510 chip, the "brain" of a 64, reads instructions and information from memory and takes care of the math and storing to memory. At regular intervals, an interrupt from the VIC-II chip stops the 6510 temporarily, so screen and color memory can be converted into video signals to be sent to a television or monitor.

When sprites are turned on, the VIC-II has to work harder, to determine X and Y positions, colors, priorities, and shapes. It also checks for collisions. The extra activity by the video chip apparently steals time from the 6510 and seems to throw off the timing for accessing files.

Software Speech

Is there a way to make a 64 "talk" without a speech synthesizer? I'm writing a game and want to have speech in it.

Billy McNaughton

There are two approaches to making a computer speak: speech synthesis, *where individual sounds are combined to create words, and* speech digitization, *where words or phrases spoken into a microphone are converted into patterns that can be stored in memory.*

Speech synthesizer cartridges usually contain a computer chip which is programmed to produce phonemes, the individual vowel and consonant sounds that make up words. Phoneme-based speech synthesizers have an unlimited vocabulary because they can string together any number of phonemes to produce any word in the language.

Other speech cartridges are word-based. They are programmed to pronounce perhaps 200 commonly used words and that's all. Word-based speech modules tend to produce more recognizable speech because the words have been digitized from actual spoken words, although the size of the vocabulary is limited.

Many readers have asked how the voices in games like Ghostbusters, Impossible Mission, Beach-Head II, International Hockey, and Kennedy Approach *were created. These and other programs use digitized speech. Each program has a small number of words and phrases it can play back. You don't need any special hardware to listen to the voices, but a digitizer and a microphone are necessary to convert the sounds to a digital format that can be used by the computer.*

You need extra hardware to digitize speech, but phoneme-based speech synthesis through software is also possible on the 64 because the SID chip can produce such a wide variety of sounds. There was once a commercial program for the Atari and 64 that synthesized speech in software, but the company that made it has apparently gone out of business. At present, we know of no software speech synthesizers that are available.

Passing Variables In Chained Programs

I'm writing a program that has to load a second program. The problem is that I need to keep the variable values from the first program. How do I do that?

Steve Blum

If the first program is longer than the second and you're working with numeric variables only, you'll have no problems. Just add the LOAD command at the appropriate place in the first program. The second program will load and automatically run.

String variables will be kept intact if they're dynamic strings, but they'll be lost if they're static. The following lines illustrate the difference:

```
10 A$="PRESS ANY KEY"
20 READ B$
30 C$="PRESS"+" ANY KEY"
```

The string variables in lines 10 and 20 are static. In the first case, the computer saves memory by setting up A$ with a pointer to the BASIC line where it was defined. In line 20, READ assigns a value to B$ and the computer creates a pointer to the appropriate DATA statement. When a new program is loaded, the pointers to both of these variables will point to a place inside the new program, with incorrect results. Line 30 creates a dynamic string by concatenating two strings via the plus sign. Since the new variable is a combination of two separate strings, the computer has to store it in variable memory. You'll find that C$ is intact when the second program is loaded. To force variables into being dynamic, add a null string (two quote marks with nothing inside) to each:

```
10 A$="PRESS ANY KEY"+""
20 READ B$: B$=B$+""
```

Loading a long program from a short one leads to disaster because the pointer to the beginning of variables is not updated when you load from within a program. You can avoid problems by following these steps:

First, load the final version of the

Shake, battle & role.

Warm up your Commodore® and get ready for full-screen graphic action.

Save the industrial world from going off the deep end of the Richter scale in *Quake Minus One*. Stop the terrorists from triggering a massive earthquake and toppling civilization.

In *Shadowfire*. Ambassador Kryxix has been kidnapped. You have but 100 real-time minutes to assemble a strike force of specialists and elite fighters to rescue him and then destroy the evil Zoff and his starship.

Embark on a quest to defeat Doomdark in *The Lords of Midnight*. Choose your role. Capture the source of Doomdark's power or conquer his forces in battle. Over 32,000 different panoramas ensure a challenge.

Visit your software dealer. Ask to see the new Beyond Line from Mindscape. And discover graphics, adventure, excitement, and fun that's beyond belief.

Mindscape

Software that challenges the mind.

Mindscape, Inc. 3444 Dundee Road, Northbrook, Illinois 60062 1-800-221-9884. (In Illinois 1-800-942-7315)

© 1985 Mindscape, Inc. All rights reserved. © 1985 Beyond. Licensed in conjuction with International Computer Group. Commodore is a trademark of Commodore Business Machines. Mindscape is a trademark of Mindscape, Inc.

*longest of the chained programs. Don't run it. If you don't know which of the programs is longest, check the pointer to beginning of variables—***PRINT PEEK(45), PEEK(46)**. The longest program will have the highest number in 46. If two are the same, pick the one with the highest number in 45. Write down the values in 45 and 46.*

Now load the first program you'll be running. Let's say the longest program had the numbers 113 and 20 in the pointer at 45–46. Add this line as the first line in the first of the chained programs:

```
1 IF AL=0 THEN POKE 45,113: POKE 46,20: CLR: AL=1
```

The values 113 and 20 are for illustration only; you should substitute whatever values you got from PEEKing 45–46 from the largest program. Since the pointer now matches the longest program, you can chain the programs. If you make any changes to the programs, you may have to go back to the first program and change the numbers for the POKEs in the line above.

Saving A Subroutine

Is there a way to load a program and then save just part of it, like the last few lines or a subroutine?

C. E. Spurlock

It depends on the length of the subroutine. If the listed lines fit within a single screen, try this shortcut. First, LIST them—if the lines are numbered 12010–12120, enter **LIST 12010-12120**. *Now type NEW, which erases the program in memory. The program may be erased, but the screen isn't. Next, position the cursor on the first line of the subroutine. Press RETURN over each line you want to keep. Since the lines have been put back into memory, you can save them to tape or disk.*

If the lines you want to keep exceed a single screen, you'll have to delete the lines you don't want. The easiest way to erase part of a program is to use a utility like "BASIC Aid" or "MetaBASIC," although there are roundabout methods for doing it directly through BASIC.

Saving Plus/4 Data On Tape

Commodore has said that saving word processing and spreadsheet data to tape (from the Plus/4's built-in software) is not possible. But I've discovered a method to do so:

1. Enter the spreadsheet or word processor by pressing the f1 key and RETURN.

2. Enter whatever information you plan to save.

3. Hold down the RUN/STOP key and press the RESET button on the side. Be sure to keep RUN/STOP down until you've released the RESET button. You're now in the machine language monitor.

4. Type **S "filename",1,4000,D000** and then press RECORD and PLAY on the Datasette. The save takes about 18 minutes.

To reload, go into the spreadsheet or word processor, press RUN/STOP-RESET, and enter **L "filename",1**. After the data is loaded, type X and RETURN twice.

Les Tuttle

Thanks for the tip. The monitor SAVE command you listed saves 36K of memory, from $4000–$D000, which is why it takes so long to complete the process. You may not have to save that much memory if you can find a pointer to the beginning and end of data. Perhaps other readers with a Plus/4 can help. You might also write to:

The Plus/4 Users' Group
Box 1001
Monterey, CA 93940

They publish a newsletter with information about the Plus/4, including reviews of commercial software. They also have a library of public domain programs for the Plus/4.

Can You Read The RESTORE Key?

I would like to know how to read the RESTORE key to see if it has been pressed.

Douglas Hoch

RESTORE is unlike any other key on the VIC or 64. The regular keys are scanned 60 times a second to see if the user has typed something. That might seem very fast until you consider that the computer's internal clock chip is zipping along at approximately one megahertz, one million ticks per second. A sixtieth of a second is a long time to a processor that works in millionths of a second.

RESTORE is wired directly to one of the 64's Complex Interface Adapter (CIA) chips. When you tap RESTORE, the CIA chip generates a nonmaskable interrupt (NMI) that happens immediately—the processor doesn't wait for the next 1/60 second to pass. The computer looks at a pointer at 792–793 and goes to a routine that does two things. It checks for a cartridge and tests the STOP key. If a cartridge is not installed and the STOP key is not pressed, the VIC or 64 goes back to the main program. Otherwise, it either follows instructions from the cartridge (if one is plugged in) or stops the program and continues with the RUN/STOP-RESTORE sequence.

So you can't PEEK the RESTORE key from BASIC. It isn't one of the normal keys. The only way to read it is to write your own machine language routine and wedge it into the vector at 792–793.

Rotates And Shifts

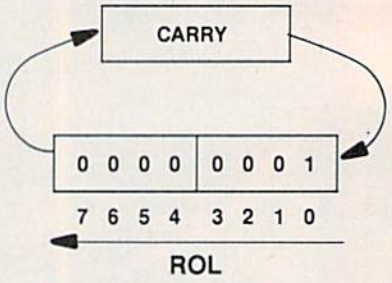
I have tested this short program with three different monitors. When it reaches the BReaK at $2008, the monitors display the contents of the registers.

```
2000 A2 04   LDX #$04
2002 A9 01   LDA #$01
2004 2A      ROL
2005 CA      DEX
2006 D0 FC   BNE $2004
2008 00      BRK
```

Most of the time, the Accumulator shows the correct value of $10, but sometimes it is something else. Also, when the first line is changed to LDX #$08, the Accumulator is almost always $80 when it should be $01. Is this a problem with hardware or software, or is it a bug in the 64?

Paul Wyles

If you look at how ROL works, you'll understand the problem in your program. Here's a diagram of what the ROtate Left instruction does:



The LDA #$01 instruction puts the number 1 into the accumulator, as the diagram above indicates. The LDX-DEX-BNE instructions create a loop that runs four times. So the rotate left (ROL) instruction executes four times, moving the 1 in bit 0 over four spaces to bit 4. So far, so good.

But every ROL also moves whatever is in the Carry flag into bit zero of the accumulator. If the Carry is clear at the beginning of the loop, the result is binary 00001000 (decimal 8). But if the Carry is set, four rotates, plus the carry, turn into binary 00001100 (decimal 12). The extra 1 in bit 2 is the Carry flag.

To solve the problem, you have two choices. Either add a CLC (CLear Carry) instruction before the loop begins, or use ASL (Arithmetic Shift Left) instead of ROL. ASL works almost the same as ROL. They both transfer bit 7 into the Carry flag. But ASL always moves a 0 into the rightmost bit, regardless of whether or not the Carry flag was set.

The answer to your second question is that it takes nine rotates, not eight, to get back the number you started with. Eight ROLs put the contents of bit 0 (a 1 in this case) into the Carry. The next eight ROLs move the 1, still in the Carry flag, eight positions left to bit 7. That's why you usually got an $80 in the accumulator.

A new set of crayons for children of the computer age.

ColorMe nurtures creativity with child's play.

A child's imagination needs little more than tools and encouragement to flourish. That's why Mindscape created ColorMe: The Computer Coloring Kit.

Every child can shine with ColorMe. Kids from the age of four and up can compose pictures without previous artistic or computer paste options using predrawn pictures.

ColorMe gives every artist room to grow.

With ColorMe, kids can draw, color, and print their own creations. Text can be integrated to create original stories. The room for creativity is limitless.

ColorMe Picture Disks make this experience. The program disk can be used alone or with one or more optional picture disks for hours of freehand drawing and thousands of cut and predrawn and ready to "cut and paste" for added color, excitement and fun.

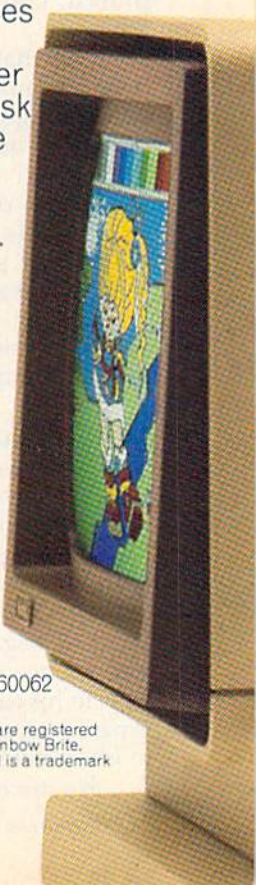
You can even take the ColorMe Supply Box with adhesive-backed paper for stickers, colored papers, buttons, cards, envelopes, and a binder for original coloring books.

ColorMe. The creative computer coloring kit.

Open a new world of excitement for your child. ColorMe does more than crayons ever could. So ask your software dealer for a demonstration. Then take home the fun.

ColorMe is available on: Apple® and Commodore®

coloring kit extra special. Choose from Rainbow Brite,™ Shirt Tales,™ Hugga Bunch,™ and TINK! TONK!™ These popular characters are



Mindscape

Software that challenges the mind.

MINDSCAPE INC

Mindscape, Inc. 3444 Dundee Road, Northbrook, Illinois 60062
1-800-221-9884. (In Illinois 1-800-942-7315)

Copyright © 1985, Mindscape, Inc. All Rights Reserved. Apple and Commodore are registered trademarks of Apple Computer Inc. and Commodore Business Machines. Rainbow Brite, Shirt Tales and Hugga Bunch are trademarks of Hallmark Cards Inc. TINK!TONK! is a trademark of TINK TONK, INC. Mindscape is a trademark of Mindscape, Inc.

Designers With New Approaches To

Kathy Yakal, Assistant Features Editor

The majority of videogames have one primary goal: *Beat the opponent*, whether it's the computer or another player. But some software designers emphasize other aspects of the game, challenging players to succeed by interacting with each other and with the game's environment.

If this industry is going to grow up, says software designer John O'Neill, then we've got to be appealing to people who don't even consider using a computer.

And any good designer knows that the best way to get someone deeply into a game is to create an environment that begs to be explored, continues designer Tom Snyder.

Not that all games should be deep, meaningful experiences. We all need light entertainment sometimes. But quite often, a good book or movie gives us insights into ourselves and our world while entertaining us at the same time. Computer software can also do that, and many software designers are turning to that kind of experience. Some of the best have been at it all along.

Long before there were computer games, or home computers for that matter, John O'Neill was formulating a philosophy that would eventually figure prominently in his current role as a game designer. O'Neill, who grew up in England, began painting as a youngster, and went on to study art in college. In his early twenties, he started experimenting with different forms of interactive art and music.

He discovered something very important when he exhibited some of his works at a one-man show in London at the age of 23. "The show felt all wrong," says O'Neill. "I felt the people out in the street should be in there, and the people in the gallery were only there because they were friends of mine, friends of the art world, or friends of the gallery. And the galleries were basically just serving the investment world."

His idealism about the way things should be was such that he said, *That's it. I'm going to retire for ten years and come up with a totally new art form, a way for artists to work with people.*

So he explored different philosophies, and eventually came to believe that the only way to create consumer products that would appeal to peoples' inner sensitivities was to work through consumerism, through mass publication and broadcasting.

He formed a company called Admacadium, a half-Latin, half-English word that means *creative catalyst*. The company's purpose was to produce art for the masses. There would be no limited editions of works to impose value, and products would be priced affordably.

"I had a lot of catastrophes," says O'Neill of those early years. He made postcards, board games, decals, cards, little books—anything that might bring *accessible* artistic pleasure to people.

He began lecturing on his theories in art schools. ("I was hated by most traditional artists and very popular with students.") He finally spoke at Stanford with David Thornburg, who told him he had envisioned the computer games of the future, that all he was missing in his material was the computer.

So O'Neill left his native England for Silicon Valley. He worked

A Difference

Computer Games

as a game designer with Ramone Zamora at Childware for a while, and designed the graphics for Atari's *E.T.* game. For the last couple of years, he has been working with a team of designers in the Bay area, producing a series of interactive videogames.

One of the first to be available is *The Dolphin's Rune*, published by Mindscape. The game combines visually pleasing images with intellectual challenge. O'Neill consulted Dr. John Lilly, a dolphin research specialist, in developing the program.

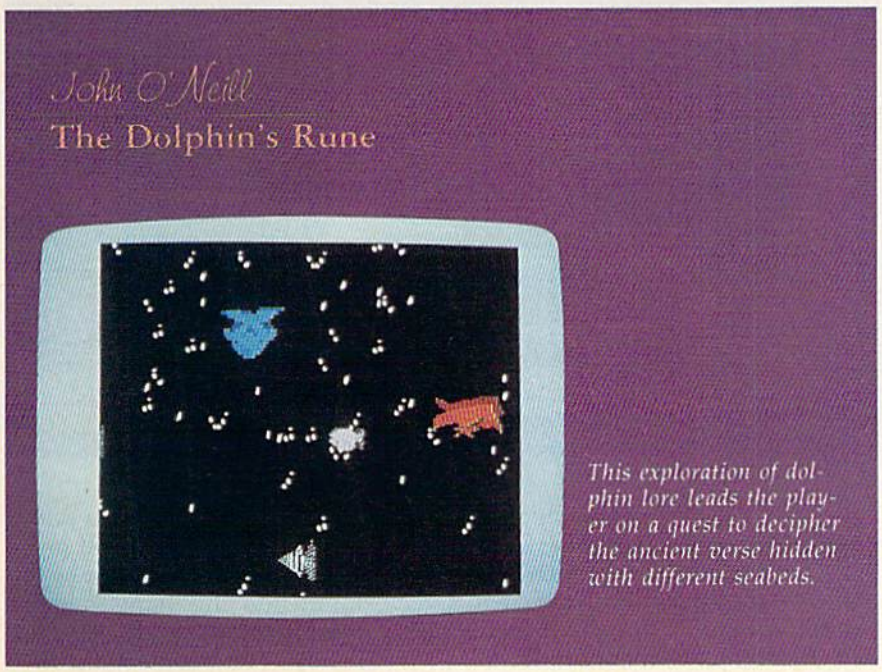
In *The Dolphin's Rune*, the player assumes the role of a dolphin searching for a nine-stanza poem. The dolphin must locate and negotiate nine different color currents to search for runes. Each rune is part of a special alphabet which unlocks one of the verses, a key to dolphin lore. Along the way, the dolphin must avoid traps like tuna nets, and remember to come up for air every eight minutes.

O'Neill often uses symbols in his games to represent the search for self-understanding. Sometimes the symbols are obvious. Other times, you may play a game several times before realizing what O'Neill is gently trying to get at.

"I try to put in as many cliches as possible so one can begin to see the cliches in one's life," says O'Neill. "In *Lifespan* (another O'Neill game), you actually *dive* into opportunities, and you can't go back for a missed opportunity. All of these sorts of things will be left in peoples' minds. After the playing of a game, they will begin to see the cliches which they use a lot but have forgotten the meaning of.

"If you give people this kind of chance to interact with themselves, they can be put in the position of looking over their own shoulders at a certain aspect of their lives in an entertaining way."

O'Neill likes to think that people will use this kind of software not only to understand themselves better, but also to understand and improve relationships with others. That people will come home in the evening and instead of asking *What's on cable tonight?*, will play one of his games together. By evening's end, they will have experienced more about each other, like



This exploration of dolphin lore leads the player on a quest to decipher the ancient verse hidden with different seabeds.

after a good conversation or a card game.

"I see a potential in software for people to improve and keep a perspective on their lives," he says. "Also for improving relations with friends and family, and having a smile while you're doing it."

From *Snooper Troops* to the recently released *The Other Side*, Tom Snyder has had that same goal in mind. His educational software, often presented in the form of a game, strongly encourages group interaction and entertainment.

Snyder has such definite feelings about using the computer as an interactive medium that when no software publisher would accept *The Other Side* without a one-player option, Snyder's own production company decided to publish it.

"I don't think we were being precious about it," he says. "We had been working on it for so long that it just didn't make any sense to us to teach kids how to resolve conflict with a computer. We didn't know what that meant. That doesn't sound like a significant step, unless you have a genuinely intriguing artificial intelligence model where the computer is behaving with all the delighful complexities of a person. And we're years from that."

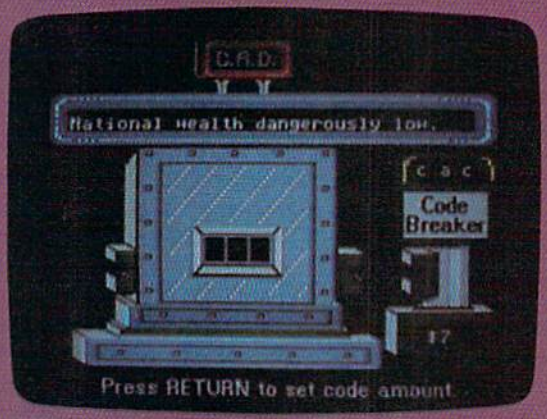
The Other Side is a world diplomacy game, a simulation of a group of world leaders trying to co-exist harmoniously while still surviving individually. It can be played by groups of people across a classroom from each other, or across an *ocean*: A modem option lets groups play over the phone.

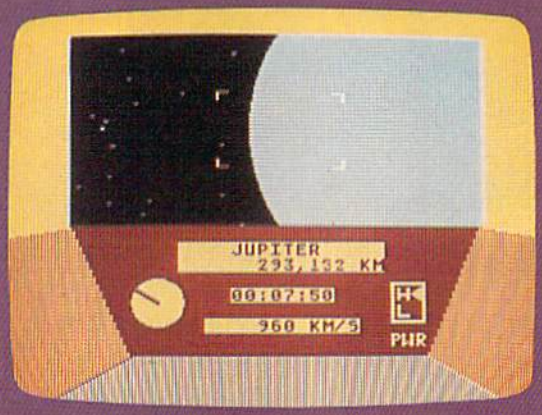
Snyder set up a game between a group of school children in Boston and a group in Geneva, Switzerland. It was the headline story on national television news in Geneva that day.

The program's Hotline feature lets players communicate during the game. "At first, these kids from two different cultures were asking questions like, *Have you guys tried new Coke yet?* and *Do you watch Miami Vice?*" says Snyder. "Slowly, as they got more involved in the game, they would say things like, *Let's make a treaty where we don't go near other peoples' countries.*"

Tom Snyder Productions
The Halley Project
The Other Side

The Other Side *promotes group interaction and negotiation in a world diplomacy setting.*





The Halley Project *offers a huge environment for players to explore: the solar system.*

That kind of cross-cultural communication takes *The Other Side* a step beyond a computer simulation. Snyder acknowledges that, but defers to the intricacies of game design and involvement of players.

"A good designer can create a pretty good simulation, but if you provide opportunities for people to have input into the game, it gets 100 percent better.

"I cheat. I let people make my

THE BEST Just Got Better!

for ATARI, APPLE COMMODORE and IBM

"HOMEPAK is a bold product! For $49.95 buyers get three programs on one disk... inexpensive, powerful, integrated software. As such, HOMEPAK is THE WINNER OF INFOWORLD'S BEST BUY AWARD*"* – INFOWORLD

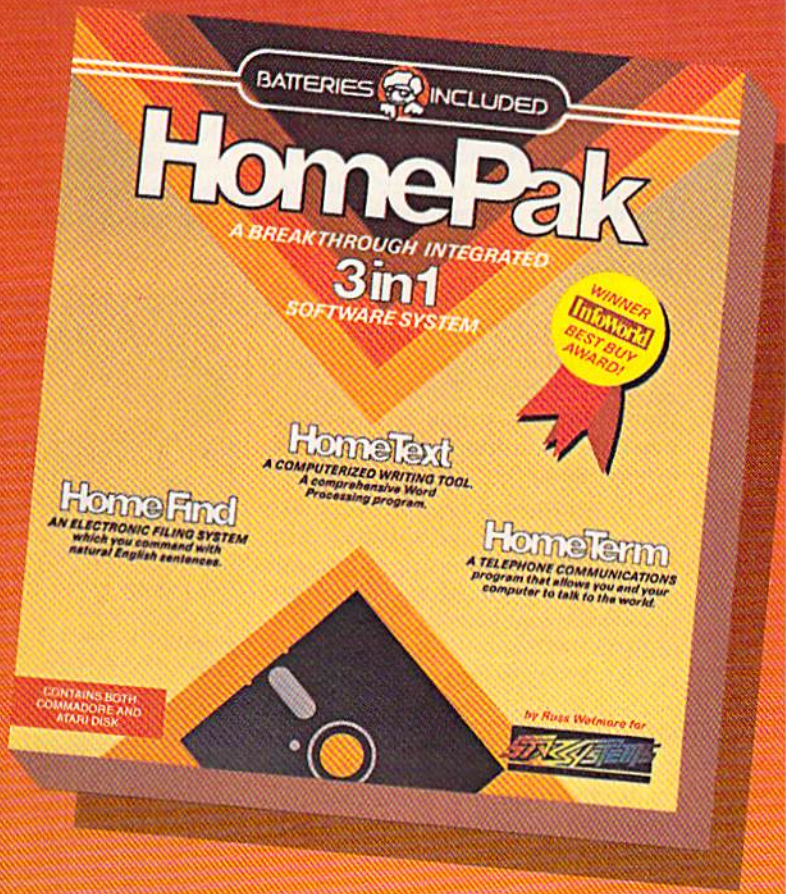
"Quite simply the best... should be part of every computer library." – ANALOG
"Performance: ★ ★ ★ ★ (Excellent). Value: ★ ★ ★ ★ (Excellent)." – FAMILY COMPUTING
"FULL FEATURED AND EASY TO USE... HOMEPAK IS EXTRAORDINARY!" – COMPUTE

The reviewers are unanimous — you get three times the computing power with this exceptionally easy-to-use package:

Access public databases and bulletin boards with *HOMETERM*. Store information and retrieve it instantly with *HOMEFIND*. Take data from the other programs and write reports using *HOMETEXT*. Possibilities are unlimited. Results are excellent.

NOW YOU GET EVEN MORE!
For a limited time** your *HOMEPAK* purchase also includes the following.

- **FREE!** Try out the DELPHI public database. Enclosed with each new package is your free membership and ID number, which allows you to take a "guided tour" of the Delphi system. Wonders await you!
- **SAVE MONEY!** With a special subscription to fun and informative **FAMILY COMPUTING** magazine. The lowest rate ever, and you get a free "Introduction To Computers" dictionary too!
- **NOW AVAILABLE FOR** Apple IIe, IIc, Macintosh †, IBM PC and compatibles, IBM PC jr, Commodore 64, 128 and all Atari computer systems!



"...HOMETEXT is comparable to the best of the low-cost word processors... HOMETERM is comparable to any telecommunications program now available... HOMEFIND is easy to learn and will handle most personal filing problems with no problems... HOMEPAK really is THE SOFTWARE BARGAIN OF THE YEAR." – DETROIT NEWS

Take advantage of these special offers today — inside the specially marked HOMEPAK package!

BATTERIES INCLUDED

"The Energized Software Company!"

30 Mural Street
Richmond Hill, Ontario
L4B 1B5 Canada
(416) 881-9941
Telex: 06-986-266

17875 Sky Park North,
Suite P, Irvine, California
USA 92714
(416) 881-9816
Telex: 509-139

WRITE TO US FOR FULL COLOR CATALOG of our products for COMMODORE, ATARI, APPLE and IBM SYSTEMS
FOR TECHNICAL SUPPORT OR PRODUCT INFORMATION PLEASE PHONE (416) 881-9816

©1985 BATTERIES INCLUDED. COMMODORE, ATARI, IBM-PCjr, APPLE ARE REGISTERED TRADEMARKS OF COMMODORE BUSINESS MACHINES, ATARI CORP, INTERNATIONAL BUSINESS MACHINES LTD., AND APPLE COMPUTER INC. RESPECTIVELY. HOMEPAK IS THE WINNER OF THE 1984 BEST BUY AWARD. * SUGGESTED U.S. LIST PRICE. DEALERS MAY SELL FOR LESS.
** OFFER EXPIRES MARCH 1, 1986 † PRICE FOR THE HOMEPAK MACINTOSH $69.95

Here, Tom Snyder participates with two groups of students playing the game.

games better for me. By putting Hotline in, and requiring more than one person to play, they bring in all sorts of depth and emotional content to a game that there's no way I could have brought in myself. People bring so much to the experience."

But the environment, the world that designers must create for a good simulation, is key to the program's integrity. Two of the elements that make that environment beg to be explored, says Snyder, are *extensiveness* and *consistency*.

"You make it big and you make it real. Not like in the old adventure games where you go right and left and retrace your steps and you're not where you started. It really has to have the feel of a real world. Like in *The Halley Project* (Snyder's solar system simulation published by Mindscape), if you go a couple of million miles in one direction, you really are there. It's not a fake hyperspace map that someone put together."

Many other software designers have developed simulations of real worlds and fantasy worlds for computer owners to explore. Some encourage competition, some cooperation, and some learning. Some foster all three.

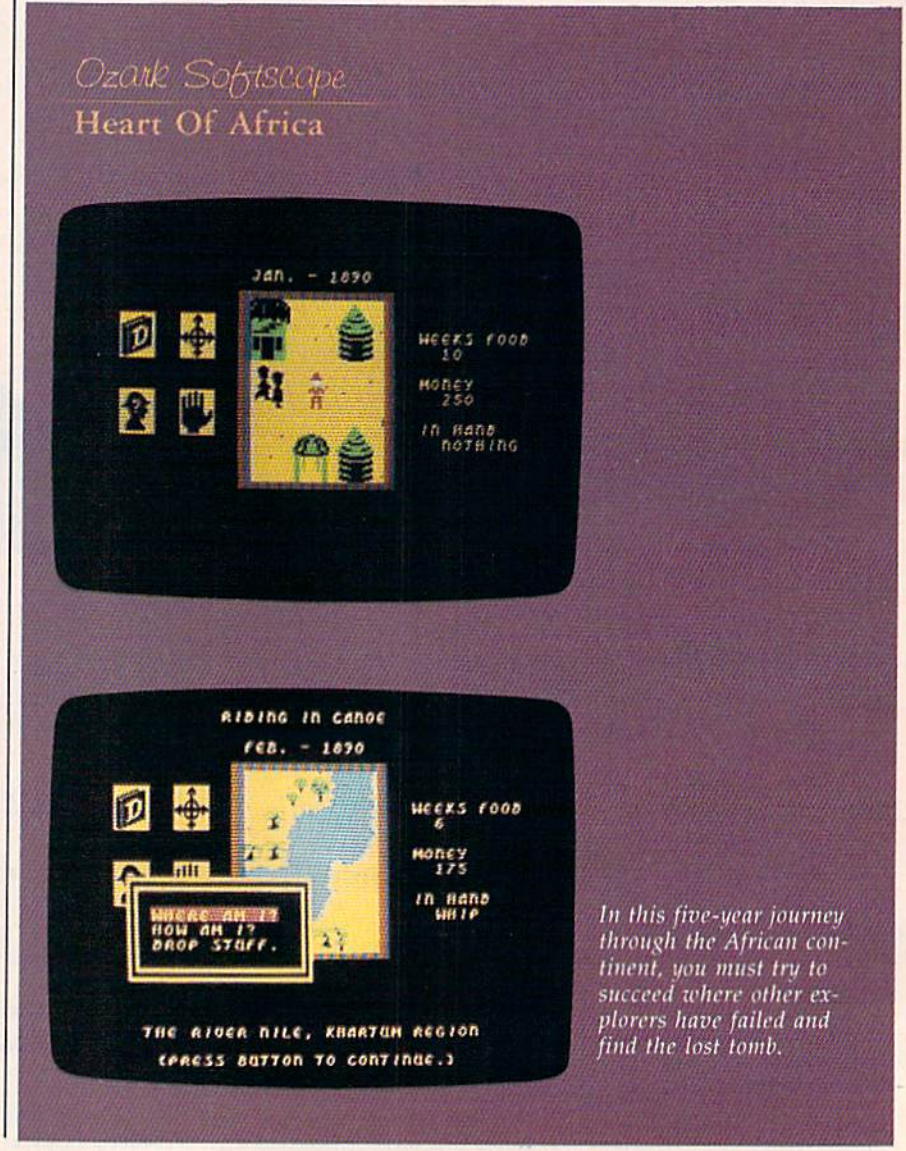
When software designer Dan Bunten and his brother Bill were young, they drew a complete naval war game board on the floor of their basement. They and the rest of the design team at Ozark Softscape have been designing world games on computer disks for the last few years. *M.U.L.E.* sent players to an unexplored planet, and gave them tools to build a new civilization. Cooperation was imperative. *Seven Cities Of Gold* simulated the sixteenth-century experience of the Spanish conquistadors setting out to discover the New World. Greed and plunder were possible, but attempts to understand and befriend the natives of this new culture were encouraged. In their latest game, *Heart Of Africa*, you must journey through unexplored areas of the African continent, looking for a tomb that could hold the lost secrets of ancient Egypt. (*M.U.L.E.*, *Seven Cities of Gold*, and *Heart Of Africa* are published by Electronic Arts.)

The Argos Expedition, designed by The Children's Television Workshop for CBS Software, is a journey into the universe to seek, retrieve, and recover artifacts from an ancient culture. The crew must work together in making every decision; at the same time, each member has his or own objective to achieve. Personal gain and group harmony must be balanced for the mission to succeed.

Though there is educational value and personal growth gained from real-world simulations, there can also be enjoyment in exploring fantasy worlds, worlds that might exist in another time or on another plane.

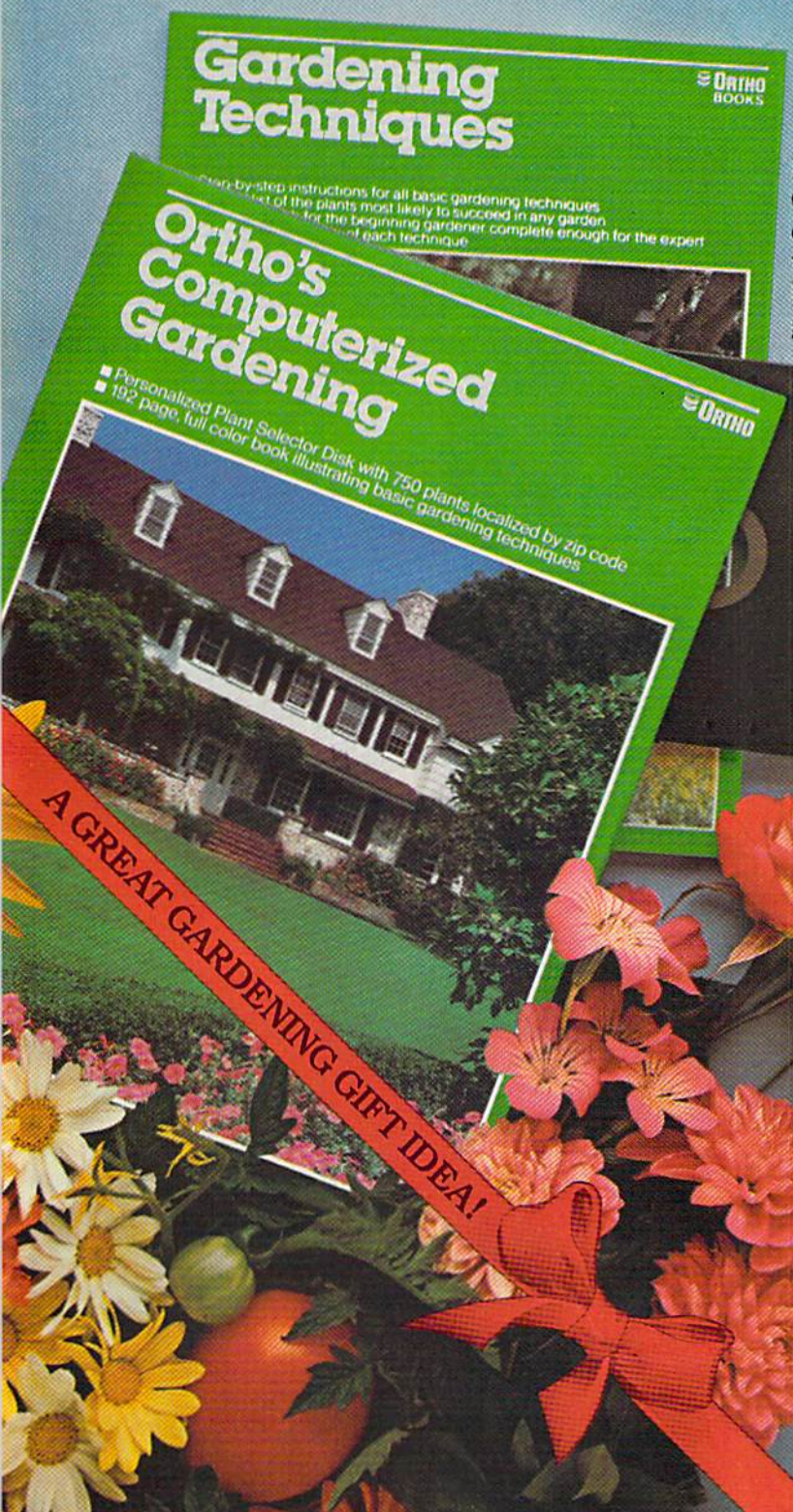
Designers at Activision believe that they may have stumbled onto a new culture, a race of people that lives in a rather unusual environment. According to designers David Crane and Sam Nelson, there's someone living in our computers.

This theory was brought to their attention by a musician who was puzzled by the fact that much



In this five-year journey through the African continent, you must try to succeed where other explorers have failed and find the lost tomb.

NOW YOU CAN PUT YOUR COMMODORE® TO WORK IN YOUR GARDEN.


Gardening Techniques
ORTHO BOOKS
Ortho's Computerized Gardening
ORTHO
Personalized Plant Selector Disk with 750 plants localized by zip code
192 page, full color book illustrating basic gardening techniques
A GREAT GARDENING GIFT IDEA!

THE PERFECT PACKAGE FOR COMMODORE COMPUTER OWNERS WHO ARE GARDENERS...AND FOR GARDENERS WHO ARE COMMODORE COMPUTER OWNERS!

Introducing Computerized Gardening from ORTHO—the first and only personalized gardening program available on computer software. It works by detailing plant and shrubs by user zip codes to provide an individualized gardening and landscaping program. Planting requirements are listed according to shade or sun-loving plants, blooming or non-blooming plants, watering needs and plant color and others.

You'll find the software available for IBM, Apple II and Commodore Computers.

Plus, included in the package is a copy of the new ORTHO Book *Gardening Techniques*—an authoritative "how-to" that shows you in color and detail page after page of gardening procedure.

The ORTHO Computerized Gardening Package is available at software outlets, bookstores and lawn and garden centers where ORTHO books are sold.

Just $49.95

For more information write:
ORTHO Information Services
575 Market Street, San Francisco, CA 94105

ORTHO INFORMATION SERVICES

Commodore® is a registered trademark of Commodore Business Machines

COMPUTER
Centers of America Mail Order Ltd.

Christmas Gift Giving at Distributor LOW, LOW PRICES!

Computers • Printers • Monitors • Compact Discs • Robots • Modems

Computer Centers of America has it all...and much, much more at distributor's low, low discount prices! Why pay more when you can buy & save! Check out these prices!

WE'RE PROUD OF OUR PRICES - SATISFACTION GUARANTEED

Check, Money Order, MC or Visa accepted / No additional charge for MasterCard and Visa / Call for shipping and handling information / NYS residents add applicable sales tax / Prices and availability are subject to change without notice / All factory fresh merchandise with manufacturer's warranty. Dealers Welcome. Call for recent price reductions and new rebate information. Plus shipping and handling. No returns without return authorization number.

IN NEW YORK STATE CALL TOLL FREE

1-800-631-1003 **1-800-221-2760** **1-800-548-0009**

OR 516-349-1020

Or Write: Computer Centers of America, 81 Terminal Drive, Plainview, NY 11803

commodore

PERSONAL COMPUTERS

***NEW!* Commodore 128 Personal Computer**	**Call For Price**
1571 Disc Drive	**Call For Price**
1901 RGB Monitor	**Call For Price**
NEW! 141M Monitor	149.95
1702 Monitor	174.95
Commodore 64 Computer	119.95
1541 Disc Drive	149.95

PRINTERS

Same As Silver Reed 400

Cardco LQ/3 Daisy Wheel Printer
Letter Quality Printer with Built-in Interface. Free Cardco Mail Now, Spell Now, Write Now Included — 199.95

Gemini SG 10	209.95
Gemini SG 15	359.95
Gemini SG 10C with Built-in Commodore Interface	Call
New! Gemini SR 10115	Call
New! Gemini SB 10	Call
Silver Reed 400	249.95
Panasonic 1091	Call

MONITORS

Sharp 13" Color Composite Monitor 13M31U	124.95
BMC Color	149.95
Pan 1300 RGB & Comp.	289.95
Sharp Green	64.95
Sharp Amber	69.95

DISC DRIVES

CCA Exclusive - New for Commodore!

Enhancer 2000 Disc Drive
Faster than Commodore 1541, Commodore Compatible, 2 Yr. Extended Warranty — 164.95

Single Drive	179.95
Indus GT Disc Drive	249.95

TOMY ROBOTS

Unleash the Power of Your Computer Directly Into the Tomy Robots
Includes: •Computer, Interface, and Disk •Create, Edit, Save, Retrieve and Mix Your Programs •For Tomy Omnibot, Omnibot 2000 and Verbot All on the Same Disk — **Call for Price**

Interfaces

Telesys Turboprint GT Prints Enhanced Graphics	59.95
Cardco G+	Call
Microworld	Call
PPI	44.95

Discs

20 Memorex SS/DD w/Storage Case — 24.95* *After Rebate

Diskettes

Nashua	8.95
Scotch	9.95
Maxell	11.95
Memorex	8.95*
BASF	8.95

*After $3 Rebate

Modems

Mighty Mo	64.95
Commodore 1660	79.95
Total Telecommunications	Call

Wico Joysticks

The Boss	12.88
The Bat	14.88
3-Way	19.88

CCA GOES VIDEO TAPE CRAZY FOR CHRISTMAS

T-120's - TDK, maxell, SONY. $4.99 EA. Minimum 6

HOLIDAY SOFTWARE SPECIALS AT UNREAL PRICES

Software Special # 1

Datasoft

$5.99 EA. *LIMITED SUPPLY*

BRUCE LEE, DIG DUG, PAC MAN, POLE POSITION

Software Special # 2

ACTIVISION HOME COMPUTER SOFTWARE

$7.77 EA.

Decathlon	Star League Baseball
Pitfall I or II	On Field Football
Zone Ranger	On Court Tennis
Space Shuttle	H.E.R.O.
Master of the Lamp	

Software Special # 3

ACTIVISION HOME COMPUTER SOFTWARE

$14.88 EA.

New! Fast Trax	***New!*** Hacker
New! Pet Person	***New!*** Alcazar
New! Hacker	***New!*** Countdown to Shutdown

Software Special # 4

EPYX

$19.99 EA.

Fastload	
Wintergames	
Hot Wheels	G.I. Joe
Temple of Apshai Trilogy	Summer Games I or II
Jet Combat Simulator	Barbie
	Hot Wheels Baseball

Software Special # 5

ACTIVISION HOME COMPUTER SOFTWARE

GHOSTBUSTERS 8.88

Penguin Software

Quest	19.99
Transylvania	19.99
Sword of Kadash	19.99
Xyphus	19.99
Graphics Magician Picture Painter	21.99

Professional Software

Fleet System 2 - Word Processor with built-in 70,000 Word Spell Check	59.95

CBS Software

Dr. Seuss Fix up The Mix-up Puzzler	19.99
Sesame Street Letter-Go-Round	19.99
Big Bird's Fun House	19.99
The Sea Voyager	24.99
Weather Tamers	12.99
Movie Musical Madness	9.99
Success w/Decimals (Add/Subt) D-T	14.99
Success w/Decimals (Mult/Div) D-T	14.99
Success w/Fractions (Add/Subt) D-T	14.99
Success w/Fractions (Mult/Div) D-T	14.99
Ducks Ahoy	23.99
Ernie's Magic Shapes	23.99
Murder by the Dozen	23.99
Astro-Grover	24.99

Access Software

Neutral Zone D-T	20.95
Spritemaster D-T	20.95
Beachhead D-T	20.95
Master Composer-D	23.95

Commodore Software

Assembler D	27.95
Easy Finance I, II, III, IV-D	19.95
Easy Calc-D	64.95
Easy Script-D	39.95
Easy Spell-D	19.95
Logo-D	49.95
The Manager-D	37.95
General Ledger	37.95
Accts. Rec.-D	37.95
Accts. Pay-D	37.95
Magic Desk-D	52.95
Silent Butler	24.95
Sky Travel	27.00

SPECIAL HOLIDAY HARDWARE PACKAGES FOR COMMODORE USERS

WOW

Commodore 64
Commodore 1541 Disc Drive
Commodore 803 Printer

369.95

TO SUBSTITUTE A COLOR MONITOR FOR THE 803 PRINTER PLEASE ADD $40

COMPACT DISCS

CCA Now Has An Exclusive Line of Compact Disc Players

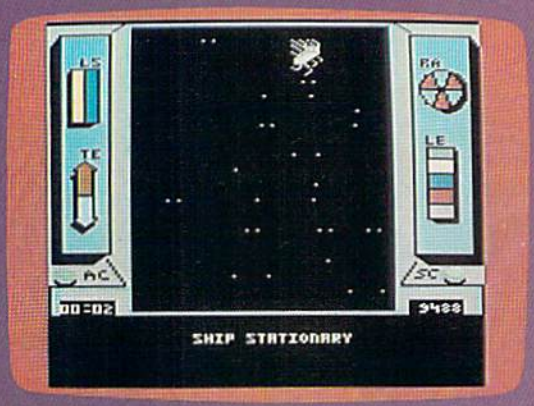
ADC
Emerson
Sherwood
Magnavox
and Many More

Priced From **159.95**

Call Toll Free:

1-800-631-1003
1-800-221-2760 (in N.Y.S.)
1-800-548-0009

The Children's Television Workshop
The Argos Expedition



Success in this space mission simulation hinges on the players' abilities to achieve both personal and group goals.

of the music he programmed sounded different from what he thought he had composed. How else, reasoned Crane and Nelson, could you explain all of the programming problems experienced by seasoned designers? Why would perfectly entered code result in syntax errors and other program bugs?

After months of research, Crane and Nelson discovered that the little creatures wanted a comfortable place to live. So they designed a 2-1/2 story "house on a disk" for the Commodore 64, with a living room, kitchen, bedroom, bathroom, and study/recreation room. It worked: A little person moved into the house. The creatures seemed to like that environment, and one has moved into every house built so far.

This miniature race of people shares several traits. They all eat, drink, and sleep. They read newspapers and books, listen to music, watch television, and work at their computers. They brush their teeth, shower, and exercise. They take good care of their pets. They play games. They get sad occasionally, but can be cheered up by a pat on the head.

The little people can read and write English, so Crane and Nelson put a typewriter in the house to send messages back and forth. When the creatures want to talk, they tap on the inside of the monitor screen. As of yet, their native language is incomprehensible to us.

The Activision design team believes that the little people learned about our culture by watching our use of computers. This would explain their ability to read and write English (through word-processing programs), their appreciation for music (through computer music software), and their enjoyment of entertainment (through videogames).

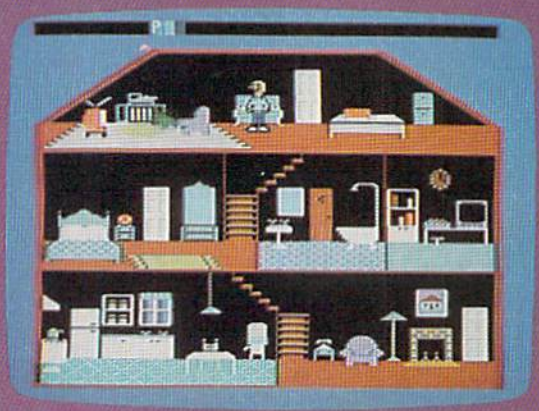
Top management officials at Activision deemed this research significant enough to create a commercial product from it, to mass-produce these houses on disk so that Commodore 64 owners can try to lure the little people out of their own computers. This new software, called, appropriately, *There's Someone Living In My Computer*, should be available in time for Christmas.

(Researchers at Activision recently built a similar house for an Apple II computer, and discovered little people there, too. They will continue to observe the little people and issue periodic updates in the form of commercial software.)

No videogame designer claims to have the one and only key to computer entertainment. They all approach projects with an eye towards what consumers want, what they enjoy designing, and what their varied backgrounds have taught them about peoples' needs. Tom Snyder's experience as a schoolteacher and musician may take him in a different direction from John O'Neill's artistic history, but both are sensitive to the opportunities for interaction and growth within the bounds of electronic entertainment.

And though the means are different than they were ten years ago, O'Neill's found that the end is the same. "I'm making games for people who think and feel, games for people who like to have products which will help them keep pulling the skin back from their eyes so they keep feeling and sensing, which I think is the role of the artist in society anyway."

David Crane and Sam Nelson
There's Someone Living In My Computer



Designers at Activision created this cozy environment to lure out the little people they suspected live inside computers. Obviously, it worked.

Why settle for less when you can have Mo?

Now with free PLAYNET software too!

Mitey Mo turns your Commodore 64 into a telecommunications giant. It's the best-performing modem with upload/download.

Mitey Mo is being hailed as "the best price/performance communications package available." Its software has received the endorsement of the U.S. Commodore Users Group, which gives a money-back guarantee to members. It is truly the industry standard, and no wonder. It's the most user-friendly modem you can buy—it will take you online faster and easier than anything else.

Mitey Mo opens up a world of practical and exciting uses for your C-64. It lets you send and receive electronic mail, link up with community bulletin boards, play computer games with people in distant places, tap into library resources, and much more. All at your convenience.

Until Mitey Mo, Commodore's 1650 Automodem was the obvious choice when you went looking for a modem for your computer. Like Mitey Mo, it has "auto answer"—it receives data while unattended. And both modems are "auto dialers"—you dial right on the computer's keyboard. But that's about where the similarity ends.

Mitey Mo can dial up to 9 numbers sequentially. But suppose you dial a number and find it's busy. Mitey Mo has "auto redial"—it hangs up and redials immediately until it gets through. With the other modem you have to redial each time—and somebody with auto redialing can slip in ahead of you.

Mitey Mo is menu driven. It lists the things you can do on the screen. Select a number and you're on your way. Since Automodem isn't menu driven, you'll be hunting through the manual a lot.

With Mitey Mo, your computer's function keys are programmable—you can save yourself plenty of keystrokes. Not so with the other modem. And only Mitey Mo lets you store data to review or print it later.

Mitey Mo has just one switch, the Smart 64 software does the rest. With the other modem you'll have to remember to check three switches, otherwise you may be answering when you mean to be originating.

Mitey Mo is half the size of the other modem. The very latest technology allows miniaturization and increased reliability, as well. Mitey Mo is so reliable, we gave it a full three-year warranty. The other modem gives 90 days, then you're on your own.

Not only will you find Mitey Mo mighty useful, you'll find it mighty reasonably priced. When you buy it, you'll get $15 of CompuServe access time and 2 hours of PlayNet free, as well. See your dealer or call us directly to order your Mitey Mo.

MODEM FEATURES	MITEY MO	COMMODORE AUTOMODEM
Auto Dial/Answer	YES	YES
Auto Redial	YES	NO
Smart 64 Software	YES	NO
Function Keys Programmable	YES	NO
Upload/Download Text & X-Modem	YES	NO
VT-52/VT-100 Emulation	YES	NO
Menu Driven	YES	NO
28K Software Buffer	YES	NO
Easy-to-Use Manual	YES	NO
Bell 103 Compatible	YES	YES
Multiple Baud Rates	YES	YES
Cable Included	YES	YES
Single Switch Operation	YES	NO
Warranty	3 years	90 days

Some mighty interesting features—ours and theirs. Yours to decide.

CDI

Computer Devices Int'l
1345-A2 Doolittle Drive
San Leandro, CA 94577
(415) 633-1899

Building Your Own Games

Selby Bateman, Features Editor

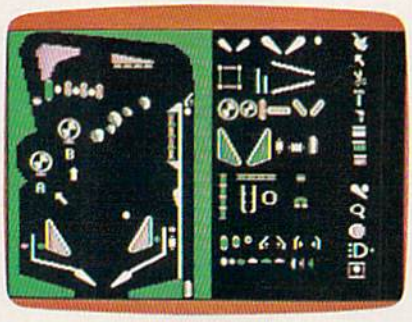
In any conversation about innovative game design, Bill Budge's *Pinball Construction Set* is almost certain to be mentioned. This computer simulation of a pinball machine sparked an entire genre of computer games: the construction set. *Pinball Construction Set* is already considered a classic in the short history of microcomputer games, and is likely to remain so for a long time.

The concept behind a construction set is simple—it is a collection of building materials and tools which let you create your own program within the computer. No special programming knowledge is required since the program presents you with a series of easy to follow menus and graphic icons, or symbols, which you manipulate to build your own program. A construction set doesn't have to be a game. There are now construction sets, whether called by that name or not, for a variety of applications.

Steve Wozniak, one of the cofounders of Apple Computer, once described *Pinball Construction Set* as the most powerful program ever written for an eight-bit machine. Whether that's still true or not, just a few minutes with any of the versions of the game—Apple II, Commodore 64, or Atari—will give you an idea of what he was talking about.

Not only did Budge introduce and then popularize an excellent concept, he carried out the idea with some of the best graphics and sound programming ever created in a computer game. In addition to five preprogrammed pinball games on the disk, *Pinball Construction Set* also presents a couple of dozen different pinball machine parts, including flippers, bumpers, slingshots, ball eaters, spinners, and polygons. You take these parts and create your own pinball environment. Change the laws of gravity if you like. Use an invisible ball. Build new shapes never before seen on a pinball machine. You can have as many as 128 parts on the screen at once.

Why was pinball the first thing Bill Budge wanted to try with his construction set idea? After all, Budge didn't even *play* pinball when he started. But, as he remembers it, many of the engineers at Apple were hooked on pinball. "Woz and Andy Hertzfeld and other Apple II heroes, people I admired, were fanatics about pinball. It got to be a craze; everyone bought machines, although I never did. And to this day, I like pinball, but I'm not a fanatic. They taught me everything I know about it."



Pinball Construction Set *offers a menu of machine parts (on the right) and a pinball palette.*

After playing *Pinball Construction Set* for a while, many people discover what Budge first realized: It's more fun to create your own games than to play someone else's.

Other game designers quickly found out the truth in that. *Music Construction Set* and *Adventure Construction Set*, both by Electronic Arts (which also sells *Pinball Construction Set*) are two program builders which use the same concept carried out in different ways. The company is now taking the idea another step with its *Video Construction Set*, an advanced graphics program for the new Amiga computer.

Bill Budge, creator of Pinball Construction Set

Codewriter Corporation markets a game builder for the Commodore 64 called *AdventureWriter*, which lets you create your own text or graphics-and-text adventure games. Other computer games which let the user build-in all or many of the parts of the program are Brøderbund's *Lode Runner*, Sub-Logic's *Night Mission Pinball*, and Mastertronic's *The Games Creator*.

What's the next step in building your own games? How about *Construction Set Construction Set*? Don't laugh. That's exactly what Bill Budge is working on: a program which lets you build a variety of other programs without learning a computer language. Not just games, says Budge, but all kinds of software.

"I could build anything from *Pacman* to *Missile Command* to a very, very powerful programming language. It's the kind of a program that has a very wide application," he says. "A physics teacher, for example, could build all kinds of simulations, of little micro-worlds, set up different labs and provide dynamic little worlds that aren't really video games."

Although still in the design stage, *Construction Set Construction Set* is one more step in Budge's long-held belief that there's always something new to be discovered within a computer.

Sing Along With Your Favorite Christmas Carols

Here's a great way for you and your family to have fun with your Commodore 64™ or Commodore 128™ this Christmas. Our exciting Christmas Carols disk features 18 of your favorite holiday songs, with professionally-arranged music and entertaining graphics. For sing along fun, the lyrics appear in easy-to-read verse on your TV or monitor. Play just your favorite song or set your computer to play them all.

SONGS INCLUDE:

- Angels We Have Heard on High • Deck the Hall
- O Come All Ye Faithful • Away in a Manger
- The First Noel • God Rest You Merry, Gentlemen
- Hark! The Herald Angels Sing • O Holy Night
- It Came Upon The Midnight Clear • Jingle Bells
- O Little Town of Bethlehem • We Three Kings of Orient Are
- Jolly Old St. Nicholas
- Joy to the World
- O Christmas Tree
- Silent Night
- What Child is This?
- Up on the Housetop

An Actual Screen

and Party Songs

For fun on New Year's Eve and throughout the year, order our Party Songs. The disk contains 18 favorites, including Auld Lang Syne, Dixie, For He's a Jolly Good Fellow, Oh! Susanna, Yankee Doodle, and more.

You can trust John Henry Software to bring you quality software at the lowest price. We specialize in prompt delivery and guarantee our product.

Don't wait, call us today! Toll Free Number:

1-800-223-2314

In Ohio call 513-898-7660

$15.95 each

Both for only $28.95

Please send me:

_____ Christmas Carols disk(s) at $15.95 each
_____ Party Songs disk(s) at $15.95 each
_____ Christmas Carols and Party Songs at $28.95

Add $1.00 for postage and handling. Ohio residents add 6% sales tax. Foreign orders, except Canada and APO, add $3.00 for Air Mail. Please pay in U.S. funds.

☐ Check or money order enclosed ☐ Visa ☐ MasterCard

Acct. # _____ Exp. Date _____

Name _____

Address _____

City _____ State _____ Zip _____

Send to John Henry Software, P.O. Box 745, Vandalia, Ohio 45377.

John Henry Software®

QUALITY IS OUR STRENGTH

GAMES

AT THE SPEED OF LIGHT

Selby Bateman, Features Editor

Tomorrow's computer games will go far beyond the blocky graphics and limited music and sound effects found on the best of today's micros. Laser-driven optical technology is already capable of bringing motion picture quality animation, live-action images, and stereo sound to videodisc arcade games, educational lessons, and training courses. The next logical step for this optical technology is its connection to your personal computer.

You push forward on the joystick and your space fighter swoops down between narrow canyon walls, jagged rocks sweeping by within inches. Suddenly, you spot enemy spacecraft. You fire rockets, pull back on the joystick, and the chase is on.

The images in this scenario appear as real as those you would see in the latest science fiction movie. And yet, you're controlling your fighter—a computer-generated sprite—through your computer, and the lifelike images are produced by an attached videodisc player. In fact, this demonstration occurred a year ago here at the GAZETTE, when a videodisc player was connected to an eight-bit Japanese computer. This type of fast-action arcade game is but one example of what's possible with today's computer-controlled videodisc.

Laser videogames such as *Dragon's Lair*, *MACH 1*, and *Space Ace* have been in the arcades for a couple of years now. They feature full stereo sound and either live-action footage or movie-style animation.

But arcade games aren't the only uses for videodiscs. They're widely accepted as teaching and training tools in education and business. It's only within the past couple of years that a sizeable number of manufacturers have been producing interfaces which connect videodisc players to computers. (See "The Videodisc Connection" elsewhere in this issue.)

The proliferation of terms associated with these laser-driven products is at first confusing—videodisc, laser disc, optical disc, compact disc (CD), and now, CD-ROM (compact disc-read only memory). What they all have in common is a laser beam. And lasers and computers are coming together in a variety of ways.

At its simplest level, a videodisc (also called a laser disc or optical disc) is little more than a 12-inch plastic record which uses a

low-power laser beam to read a spiral set of album tracks, much like a conventional stereo turntable uses a diamond-tipped stylus. The laser beam has random access to the information on the disc, similar to the random access of a computer floppy disk. While a floppy disk uses a magnetic storage technology, a videodisc has its information entered as tiny pits on the plastic record. The laser reads the pits, as the videodisc spins at speeds up to 1,800 rpm. The storage capacity of a videodisc is more than 100,000 still frames, with each of those frames accessible by the laser within a fraction of a second.

There are videodisc players available from Pioneer, Sony, Hitachi, and others. But despite the promise of videodiscs, there are currently only some 200,000 players in homes, schools, and businesses in the U.S. As videodisc entrepreneur Allen Adkins says, every year someone tells him that *this* is the year that videodiscs will take off and become a mass market item. Although it hasn't happened yet, Adkins and many others are taking part in a related industry boom which is having dramatic effects on the future of videodiscs.

The name of the boom is CD (compact disc), an optical audio recording format which uses digital encoding of information and can store up to 550 megabytes of audio data. CDs have been very popular among audiophiles for the past year or so. Now, lower priced CD players and a growing library of recordings available on the small (4.7 inches) discs are turning these audio machines into mass market items.

Already, some manufacturers are preparing dual-purpose players which will run audio CDs and videodiscs on the same machine. For example, Pioneer's CLD-900, priced at about $1200, will play both audio CDs and videodiscs.

Another important development has been the introduction of CD-ROM players, digital compact disc players with the data storage capacity to include entire encyclopedias on just part of a disc. The information can then be read by your computer. (See "CD-ROMs: The Ultimate Database" in the November GAZETTE.)

"The consumer CD and CD-ROM are going to do a lot to popularize laser discs," says Adkins,

Videodisc-based kiosks are in use as information booths and point-of-purchase displays in many stores, airports, and hotels.

The Videodisc Connection

Linking your Commodore 64 or 128 to a videodisc player is getting easier all the time, thanks to the growing number of companies making interfaces and supporting software for that purpose. In fact, no matter what kind of computer you have, there are more and more videodisc connectors becoming available.

Allen Communications, for example, manufactures the $149.95 Allen MVP (Most Valuable Peripheral) Interface which will connect a Commodore, Apple, or Atari computer with many videodisc players, such as those made by Pioneer, Sylvania, Magnavox, and others. With the package, you also receive software which shows you how to use the system, and helps you learn how to design your own programs. This and other Allen systems are used in educational, marketing, and entertainment applications.

In addition to developing your own programs, you can purchase an array of prepackaged videodiscs which have been created specifically for use with a computer—games, educational packages, and training programs.

The MVP interface lets Commodore 64 and 128 users connect their systems to a variety of videodisc players.

president of Interactive Arts International, a videodisc software development firm, and of Optical Media Services, a company which helps software firms put their information on CD-ROMs. Adkins expects to see computer games using CD-ROMs available in 1986. "The longer-term market for 12-inch videodiscs is pretty good, especially in storing information for educational purposes," he says.

Without realizing it, many people have used videodiscs while shopping or travelling. An increasing number of shopping malls, airports, and retail stores have videodisc kiosks, stand-alone information centers which provide information at the press of a button.

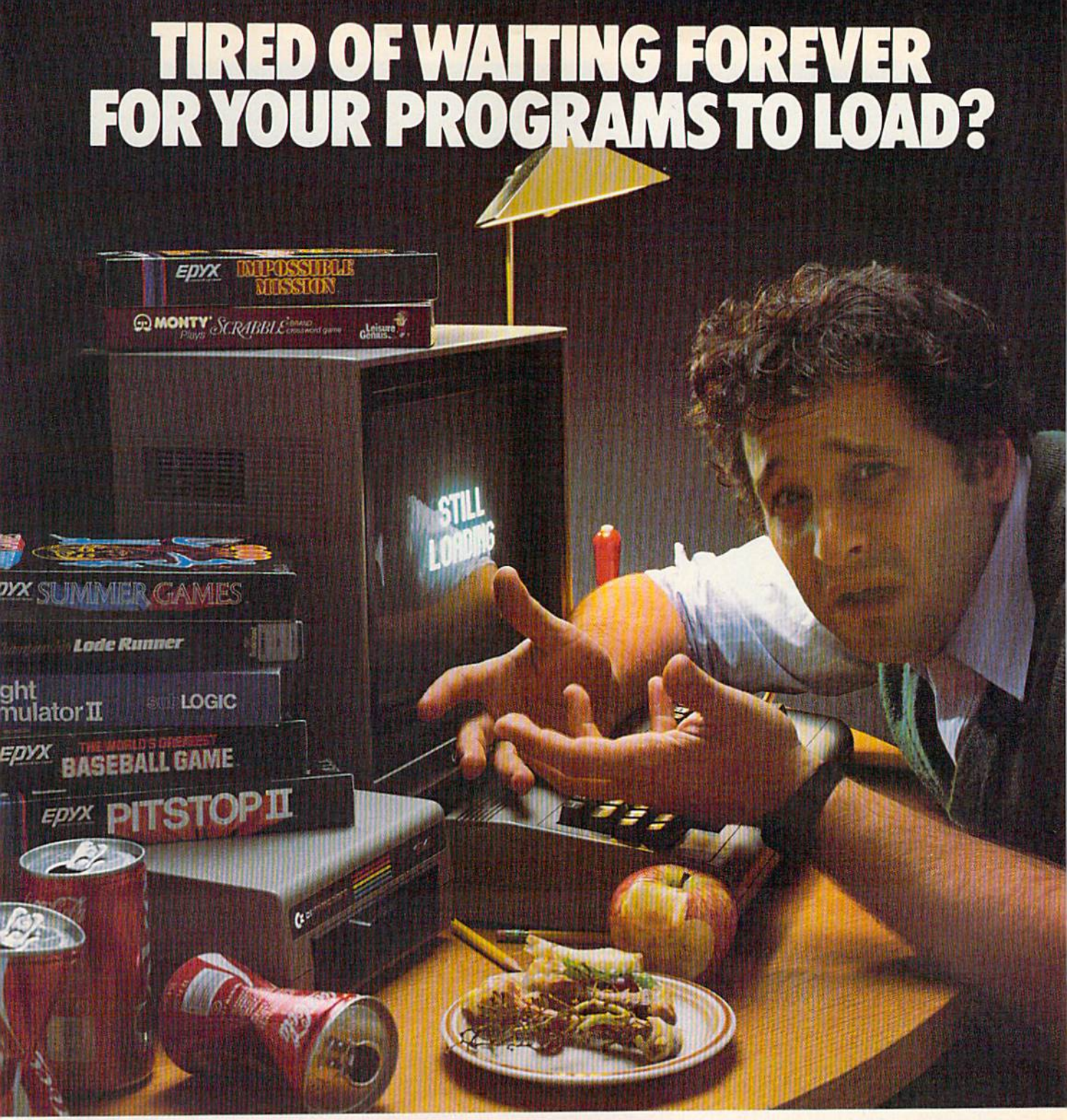
Let's say you've just flown into Chicago and want to get some information about restaurants in the city. In the lobby of your hotel is a computer-controlled videodisc hidden within an attractive kiosk which has a variety of information for visitors. On the monitor, you see a menu of options, including one labelled RESTAURANTS. Pressing the number next to the label, you see a second menu which lists types of cuisine: Italian, French, Greek, American, Chinese, and so on. You choose one, and the videodisc quickly lists dozens of restaurants and their locations. You again make a choice, and a menu for that restaurant appears on screen. With each key press, the laser beam is skipping from topic to topic.

This same kind of application is being used in corporate training programs, self-paced college courses, and retail product demonstrations, to name only a few. The same techniques used in these videodiscs for education and business have also been applied to games.

For instance, in 1981, a videodisc game for the home called *How To Watch Pro Football* was available. The disc offered scenes from NFL games, and the user tried to predict what plays would be called. Other videodisc releases have included *The First National Kidisc*, a children's games package; *Murder Anyone?*, a murder mystery in which players tried to guess the murderer; and *Astron Belt*, a *Star Wars*-style action game.

One of the most successful

TIRED OF WAITING FOREVER FOR YOUR PROGRAMS TO LOAD?



INTRODUCING THE FAST LOAD CARTRIDGE FROM EPYX.

You're tired of waiting forever for your Commodore 64 programs to load. But it's no use glaring at your disk drive. Calling it names won't help, either. It was born slow — a lumbering hippo. You need the FAST LOAD CARTRIDGE from EPYX. FAST LOAD transforms your Commodore 64 disk drive from a lumbering hippo into a leaping gazelle. With FAST LOAD, programs that once took minutes to load are booted up in a matter of seconds.

FAST LOAD can load, save and copy your disks five times faster than normal. It plugs into the cartridge port of your Commodore 64 and goes to work automatically, loading your disks with ease. And that's only the beginning. You can copy a single file, copy the whole disk, send disk commands, and even list directories without erasing programs stored in memory.

And unlike other products, the FAST LOAD CARTRIDGE works with most programs, even copy protected ones, including the most popular computer games.

The FAST LOAD CARTRIDGE from Epyx. Easy to insert, easy to use and five times faster. So why waste time waiting for your disks to load?

Speed them up with FAST LOAD!

EPYX™

The MVP is controlled through one of the joystick ports on the Commodore 64 or 128 (a cable is provided). Functions such as PLAY, PLAY TO, FIND, STEP FORWARD and REVERSE (at designated increments), and SLOW, plus many more are included. The Allen interface also lets you control the video display through software commands, and switch from computer video graphics to videodisc video (live action or still frames). The product comes with a prepackaged demonstration of MVP functions.

Allen Communication, which has extensive experience in videodisc technology for education and business, also provides other interface systems for Apple and IBM computers.

Two other companies involved in Commodore 64 videodisc usage are Touch Technologies of Escondido, California, and MicroEd, Inc., of Minneapolis. Touch Technologies markets the $149 CLAS-LD (Computerized Lesson Authoring System—Laser Disc) software-hardware combination, which works with a Pioneer LaserDisc player (about $800) and Touch Technologies' LaserVideo Controller interface ($200) connected to a Commodore 64 or 128.

There is also a version for the IBM PC/PCjr/XT/AT and compatibles: $229 CLAS-CBT (Computer-Based Training) software, LaserDisc, and Pioneer IU-04 interface ($250) connected to an IBM computer.

The CLAS system lets nonprogrammers create video images and computer text on the same monitor for computer-based education and training. With its emphasis on flexibility and ease of use, the potential applications are extensive.

MicroEd sells a $29.95 software package for the 64 which is used in conjunction with North American Philips' commercial laserdisc covering the life and works of Vincent Van Gogh. The company, under the direction of Thorwald Esbensen, has been investigating educational uses of videodiscs for over five years.

One example of the company's work during the past couple of years has been its involvement with the LaserSoft educational software project. Working with the Society of Visual Education (SVE) in Chicago, Esbensen developed a flexible videodisc-based educational system centered on images chosen from approximately a half-million photographs in the SVE library. Touch Technologies developed the Commodore 64 interface controller for that system.

While the marriage of videodiscs and computers is still in its infancy within the consumer market, there are already a couple of dozen companies which can provide product information on videodisc-computer interfaces. Listed below are those companies which currently have Commodore 64/128-videodisc interfaces and/or software. Additional interfaces for the Commodore may be forthcoming from other companies as well.

Allen Communiation
140 Lakeside Plaza II
5225 Wiley Post Way
Salt Lake City, UT 84116

Learning Link Corp.
2880 South Main
Suite #111
Salt Lake City, UT 84115

MicroEd, Inc.
P.O. Box 24156
Minneapolis, MN 55424

Systems Impact, Inc.
4400 MacArthur Blvd. NW
Suite 203
Washington, DC 20007

Touch Technologies
609 South Escondido Blvd.
Suite 101
Escondido, CA 92025

videodisc-based ventures was a game called *Dragon's Lair*, produced by Don Bluth Animation. This classically animated game created a short-term sensation in video arcades when it was released several years ago. A similar production from Bluth, *Space Ace*, uses the same kind of animation and stereo sound. Players make split-second decisions as they navigate through the onscreen perils.

Despite the excitement of videodisc-based games, the relatively high production costs and expensive retail prices of videodiscs have kept sales and demand far below today's VCRs and the new CDs.

"But let me tell you what we just ran into that's going to put a completely different complexion on this whole market," says Thorwald Esbensen, president of MicroEd, Inc., a software development company which has been involved with videodisc technology for more than five years.

The classic animation and interactivity of videodisc games such as Space Ace *go far beyond the graphics of today's computer games.*

"The new Amiga from Commodore. You can take images, either still frames or motion frames, off laser discs or videotape and embed them on the Amiga disk, then use them in your program. And you can also take prerecorded music or voices and embed those in your program," he says. "That's going to be a new and potentially very potent market. It's going to combine in one unit the dynamic features of laser discs, videotape, music, and your micro stuff all together."

With the computer hardware advances of the Apple Macintosh, the Amiga, and the Atari ST, plus the related software improvements, Esbensen and many others are betting that laser disc technology is now going to move forward at a much faster pace.

EPYX PRESENTS LUCASFILM GAMES.™ KORONIS RIFT™

WIN a day at Lucasfilm! Special sweepstakes offer.*

© 1985 LFL.

It takes all kinds to make a galaxy interesting. Like you, a *techno-scavenger.* Your kind are out to get rich scavenging Ancient technology. And now you've found the fabled Koronis Rift—the weapons testing grounds of the Ancients. The chance of a lifetime awaits you.

Abandoned war hulks litter the Rift—crammed with exotic weapons and technology. The lifelike fractal graphics take you to this mythical land of the Ancients. The mind's-eye point of view puts you right in the driver's seat of a Surface Rover. A hulk looms before you—your mind races, feverishly planning a strategy. What weapons do you need to survive? What technology will fetch the highest price? If you can pack your battered Rover full—you'll be rich beyond your wildest dreams.

But it won't be easy. The Guardians—genetically engineered mutants—stand watch over their creators' technology. And they deal swiftly and ruthlessly with characters like techno-scavengers.

But you've got a plan. If you and your trusty Science Droid can scavenge the right combination of weapons and technology—and get off the planet alive—you'll make it big. Destroy the Guardian base and you'll even be a hero! The treasures of the Ancients are yours . . . if you've got what it takes.

	C64/128	ATARI	APPLE
Koronis Rift	✓	✓	✓

© 1985 LFL.

© 1985 LFL.

* See specially marked boxes for details. No purchase necessary. Sweepstakes ends Dec. 31, 1985. Official rules available at participating dealers.

EPYX® COMPUTER SOFTWARE

1043 Kiel Ct., Sunnyvale, CA 94089

Strategy Games for the Action-Game Player®

Lucasfilm Games, Koronis Rift, and all elements of the game fantasy: TM & © 1985 Lucasfilm Ltd. (LFL). All Rights Reserved. Epyx, Inc., Authorized User. ®: Registered Trademarks of Epyx, Inc.

Whirlybird

Philip I. Nelson, Assistant Editor

This hyperactive bird lays some rather unusual eggs. A fast action game written entirely in machine language for the Commodore 64. A joystick is required.

"Whirlybird" is a fast, updated version of the classic game *Breakout*. It's written entirely in machine language. You control the Whirlybird, who flies back and forth at the top of the screen, spinning continuously. The goal is to clear out the layers of colored bricks at the bottom by bouncing eggs against them. When an egg moves back in your direction, move the Whirlybird into its path to bounce it back down. The game ends when you clear the field of bricks or run out of eggs.

Starting Up

Whirlybird must be typed in with the "MLX" machine language entry program published frequently in COMPUTE!'s GAZETTE. If you're using tape, change **POKE782,1** to **POKE782,0** in line 763 of MLX before running MLX. Read the MLX instructions before you begin typing, and be sure to save a copy of Whirlybird before running it. Here are the addresses you need for MLX:

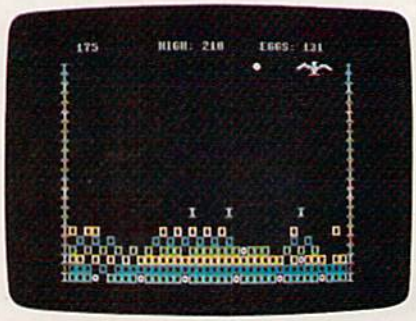
Starting address: 49152
Ending address: 52241

Plug a joystick into port 2, then load and run Whirlybird as if it were a BASIC program. *Do not try to start the program with SYS.* The playfield appears immediately, with the Whirlybird twirling across the top of the screen. On either edge is a sparkling row of sidebeams, and below are multicolored rows of bricks. At the upper right is the number of eggs you'll have in this game. Though the usual number is ten, you can get a smaller or larger number (up to 255) by pushing the joystick backward or forward. (Don't select zero—you'll simply return to the startup screen.)

Next you must pick the skill level. Press f1 to play a normal game or f3 for an expert game. At the expert level, the Whirlybird is only half its normal size, making it harder to hit the eggs. After choosing the level, the prompts disappear and play begins.

Press the fire button to release the first egg. You earn one point every time you hit a brick, and ten points every time you bounce an egg back down with the Whirlybird. Letting the egg fly past you into space subtracts ten points from your score (unless it's already under ten). When that happens, the sidebeams sparkle continuously until you press the fire button again to release the next egg. Play continues until you lose all your eggs or clear the field of bricks. A 50-point bonus is awarded for clearing every brick from the screen.

In addition to normal bricks, the playfield contains a few round ones. When the egg hits one of those, the Whirlybird swoops down to deposit a sidebeam somewhere above the playfield. This doesn't affect your score, and you get a free egg as well (press the fire button to release it). However, the extra sidebeams add an extra element of uncertainty since the egg rebounds sideways from them (not up and down) and they may or may not disappear when struck.



The whirlybird has just flown past an egg. This machine language game uses interrupt-driven routines to spin the bird and move it smoothly across the playfield.

Whirlybird displays your current score as well as the highest score attained during the current session (which may include more than one game). When a game ends, both scores are displayed until you release the first egg in the next game. Then the current score is cleared to zero. Since the high score is stored within the program code, you can record it for future comparison by resaving the game after each session ends. (It's a good idea to resave it with a different filename—like "BIRDHIGH"—to distinguish it from the original copy, which then serves as a backup.) The next time you load and run Whirlybird, it displays the previous highest score.

The Joystick Accelerator

It may take some practice to master the joystick motion in Whirlybird. Rather than zooming immediately to the spot you want, the bird moves in an elastic manner that simulates the inertia and momentum of a natural object. It takes a bit of pushing to overcome the bird's inertia and get it moving. The longer you push in one direction, the more speed and momentum you

EPYX PRESENTS LUCASFILM GAMES™. THE EIDOLON™

WIN a day at Lucasfilm! Special sweepstakes offer.*

© 1985 LFL.

You've just discovered the Eidolon—a curious 19th century machine whose inventor vanished without a trace. Only his journals and sketches remain. They tell of an incredible magical realm—a maze of caverns populated by strange creatures noted as Greps, Biter Birds and Bottlenecks. And "intelligent" Guardian Dragons—who hurl colored fireballs of energy?

The machine itself belies its quaint Victorian charm. For the Eidolon glows with the power of enchanted energy. It awaits, pristine and gleaming—perfectly preserved for over a hundred years by the powerful forces that propelled it and its pilot to another dimension.

With the fascinating first-person point of view, you can climb into the pilot's chair and fly this mysterious magical machine. And the haunting fractal graphics take you deeper and deeper into an endless maze of mystical caverns.

An adventure so real, it'll make you wonder: What ever happened to the Eidolon's mysterious inventor? Only the adventurous of spirit will know his fate. The Eidolon—scientific curiosity, or passport to a magical dimension?

	C64/128	ATARI	APPLE
The Eidolon	✓	✓	✓

© 1985 LFL.

* See specially marked boxes for details. No purchase necessary. Sweepstakes ends Dec. 31, 1985. Official rules available at participating dealers.

EPYX® COMPUTER SOFTWARE

1043 Kiel Ct., Sunnyvale, CA 94089

Strategy Games for the Action-Game Player®

Lucasfilm Games, The Eidolon, and all elements of the game fantasy: TM & © 1985 Lucasfilm Ltd. (LFL). All Rights Reserved. Epyx, Inc., Authorized User. ®: Registered Trademarks of Epyx, Inc.

gain (up to a point). After you let up on the stick, the bird slows down and eventually stops by itself. Hitting the sidebeam reverses your direction immediately. Reversing direction in midscreen may take a long or short time depending on your speed.

You might think of the joystick in this game as a gas pedal in a car. Keeping your foot on the accelerator makes the car move faster and faster. Let up and the car gradually slows down. Learning to control the acceleration takes some time. You may find it more effective to move the Whirlybird with short taps on the joystick, rather than long periods of acceleration.

Egg Juggling

The direction an egg bounces when it hits the Whirlybird depends on which way you're pressing the joystick. If you're not pressing it left or right, the egg rebounds as if the bird were a solid wall. If you're pressing the stick left, the egg bounces to the left; if you're pressing right, it bounces to the right. This lets you control the direction of every bounce. But don't move the stick so much that you miss the egg completely.

The result of a bird-egg collision also depends on what part of the bird you hit. The safest strategy is to hit the egg with the bird's feet. Bouncing it off a wing is more dangerous, since the bird never stops turning. If the egg arrives when the wing is outspread, you'll usually get a normal collision. But if the Whirlybird happens to be facing sideways—making it very slim in profile—the egg may miss completely.

Occasionally a wing collision causes the bird to juggle the egg briefly. Juggling gives you extra points and may also change the angle of rebound slightly (a boon when you're short on eggs and need to clear the last few bricks). But it's also dangerous, since the bird may juggle the egg upward and out of play. Juggling occurs less frequently at the expert level; with smaller wings it's more difficult to get multiple collisions.

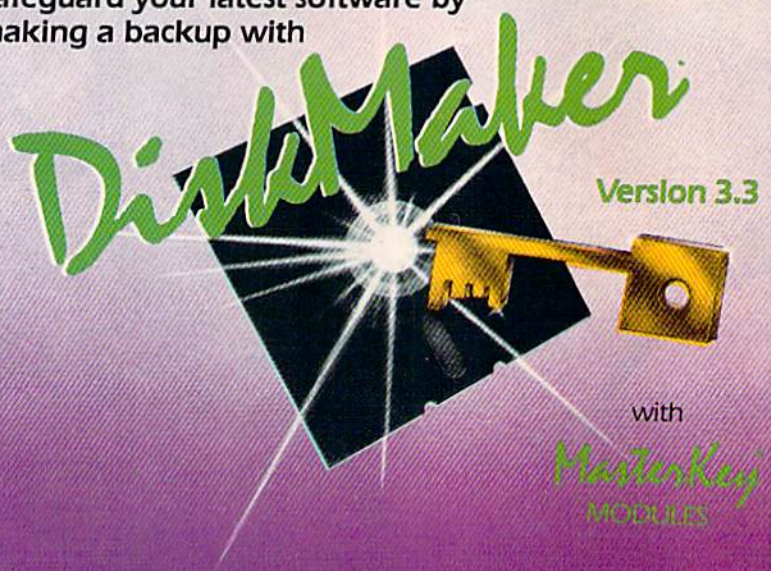
Rings And Filters

Whirlybird's unusual sound effects are created with two voices of the 64's sound chip. Voice 3 is used as a random number generator (to pick a random screen position and direction for each new egg) and doesn't produce any sound. Voice 1, set for a pulse waveform, makes a "boing" sound when an egg bounces, and voice 2 creates low, thrumming tones in the background with a ring modulated triangle wave. The vibrato-like effect results from ring modulated overtones that slowly pass in and out of phase with the frequencies of voices 1 and 2.

These sounds are made more interesting by passing them through a combined lowpass/bandpass filter and sweeping the filter's cutoff frequency up or down in conjunction with other game events. When you start the game or when the egg is flying freely, the cutoff frequency sweeps up and down, creating a gradual *meow-meow* effect. When the egg hits something, the cutoff frequency is set high and swept rapidly downward to accentuate the bouncing noise.

See program listing on page 147.

Safeguard your latest software by making a backup with



THE 3 BEST COPIERS AVAILABLE ALL IN ONE SUPER PACKAGE

No hardware necessary, easy to use, NEW! MasterKey™ system makes Diskmaker virtually 100% effective!

Copies new custom G.C.R. code protection, long data-block logic, no-sync data blocks, NEW wide head protection, and many other specialized protection routines. Copies normal and protected disks. Includes 3 copiers – FAST copier, VARI-SECTOR copier, and AUTO-LOGIC NIBBLER. Actually copies a full disk in only 2 minutes. Inexpensive module releases keep you up-to-date. MODULES available by subscription or individually.

Only **$49.95** for copier system

To order CALL **805-687-1541 ext 64**
Technical line 805-682-4000 ext 99

Also available DiskMaker™ ToolKit™, SUPER Disk Utility package. Ask for SPECIAL Combo offer with DiskMaker™.

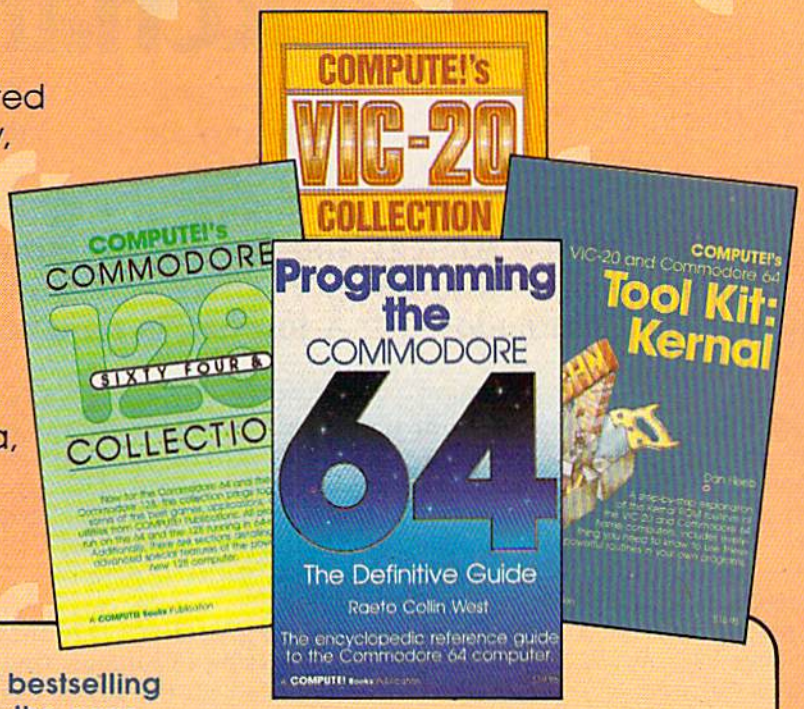
Order by phone 24 hrs/7 days or send cashiers check/money order Payable to BASIX. Visa, MasterCard & American Express include card # and exp. date. Ca. residents add 6% tax. Allow 2 weeks for clearance of personal and co. checks. Add $3.50 shipping/handling for continental US. $5.50 for UPS air. COD's shipped to 48 states only, add $4.00. AK, HI, APO, FPO add $7.50. Canada add $10.00. Other foreign orders add $15.00 and remit, certified US funds only. No credit card orders from outside North America. Dealers & Distributors invited & supported.

DISKMAKER PAYS FOR ITSELF THE FIRST TIME YOU USE IT

basix
3463 State Street · Suite 1541A · Santa Barbara · CA 93105

COMPUTE! Books Supports Commodore Computer Users

COMPUTE Books is dedicated to bringing you top-quality, reliable, and understandable tutorials, applications, games, reviews, product information, and programming aids. Whether you have a Commodore 64, 128, VIC-20, or a new 128 or Amiga, COMPUTE! has the books you need to get the most from your computer.



Look over this collection of bestselling computer titles and choose the ones you want for your favorite Commodore computer. To order any of these outstanding Commodore titles, call toll-free 800-334-0868 (in NC 919-275-9809).

COMPUTE!'s Personal Accounting Manager for the Commodore 64 and 128

Roland A. Frechette
A complete small-business/home accounting system with 13 support routines, from income and expenses to property and investments.
$12.95 ISBN 0-87455-014-9

The Amiga: Your First Computer

Dan McNeill
Everything a beginner needs to know to get started quickly with the Amiga, including setting up the system, selecting software, and learning about the hardware.
$16.95 ISBN 0-87455-025-4

COMPUTE!'s VIC-20 Collection

Edited
More than 70 never-before-published articles, games, utilities, applications, and tutorials for the Commodore VIC-20.
338 pages
$12.95 ISBN 0-87455-007-6

COMPUTE!'s VIC-20 and Commodore 64 Tool Kit: Kernal

Dan Heeb
The invaluable reference guide to the Kernal routines on the Commodore 64 and VIC-20 for beginning to advanced programmers.
429 pages
$16.95 ISBN 0-942386-33-7

Programming the Commodore 64: The Definitive Guide

Raeto Collin West
An encyclopedic, thorough reference guide which covers the Commodore 64 in its entirety.
609 pages
$24.95 ISBN 0-942386-50-7

COMPUTE!'s Commodore 64/128 Collection

Edited
Some of the best games, applications, and utilities from COMPUTE! Publications for the Commodore 64 and 128 in 64 mode, plus special sections detailing the advanced features of the 128. A disk is also available which includes programs in the book.
285 pages
$12.95 ISBN 0-942386-97-3

COMPUTE! Publications, Inc. abc
One of the ABC Publishing Companies
324 W. Wendover Avenue, Suite 200, Greensboro, NC 27408, 919-275-9809
Publishers of COMPUTE!, COMPUTE!'s Gazette, COMPUTE!'s Gazette Disk, COMPUTE! Books, and COMPUTE!'s Apple Applications

COMPUTE! books are available in the U.K., Europe, the Middle East, and Africa from Holt Saunders, Ltd., 1 St. Anne's Road, Eastbourne, East Sussex BN21 3UN, England.

Quickchange

Kevin Mykytyn and Mark Tuttle

You'll need a good strategy and fast reaction time to succeed in this mind boggler. Three games in one for the Commodore 64. A joystick is required.

Are you ready for a challenge? "Quickchange"—three games in one—requires logical thinking, manual dexterity, and a good strategy. If you work quickly and stay cool, you should be able to survive for a few rounds. None of the games is easy to master. The three games use the same board and have the same basic format, but each has a different twist.

Quickchange is written entirely in machine language, so "MLX" (published frequently in this magazine) is required to type it in. After loading and running MLX, respond to the starting and ending address prompts with 49152 and 51227. Type in Quickchange and save a copy. To load the program, type LOAD "QUICKCHANGE",8,1 for disk or simply LOAD"QUICKCHANGE" for tape. When it's finished loading, enter SYS 49152. Be sure to have a joystick plugged into port 2.

You're first presented a menu with a selection of three games: Flip Flop, Missing Pieces, and No Turning Back. Move the arrow with your joystick to select a game, and press the fire button to start. It is suggested that you start with Flip Flop and progress to No Turning Back.

Flip Flop

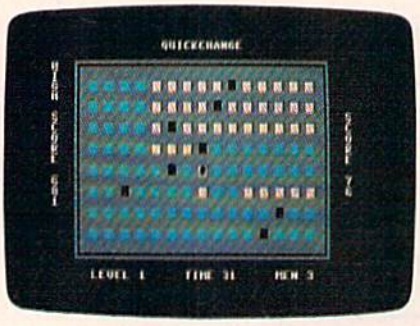
The playing field is a 120-square grid, 8 rows by 15 columns. You're represented by the black circle starting at the center of the grid. Eight black pieces, one in each row, start at the left and move across the grid. Each moves at a different rate of speed to the far right edge and then returns, and so on. Contact with one of the black squares costs one player (you begin with three).

The object of the game is to move your piece around the grid and change the color of all the squares from pink to blue (different colors in successive levels) while avoiding the moving black squares. And all this must be accomplished in 60 seconds. Moving into one square instantly reverses its color. It's important that you choose your course carefully. Backtracking over blue squares changes them back to pink. When you complete the grid (change all squares to blue) within the allotted time, you advance to the next level. For each successive level, the speed of the black squares increases. It doesn't get any easier.

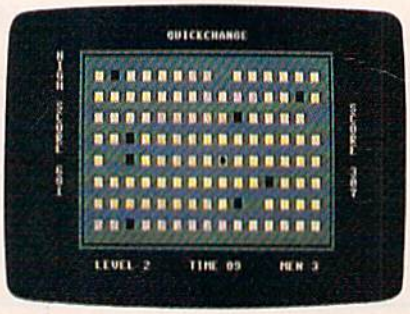
One point is awarded for each square you flip to blue. However, once a square is flipped, you do not receive any additional points for flipping it again. You lose a point for changing a square to the wrong color and gain back the point when it's changed back to the right color, so your score can move up and down. You receive 100 bonus points for each level completed. Throughout the game, current score, high score, current level, time remaining, and number of players remaining are displayed. The game can be paused at any time by pressing SHIFT or SHIFT LOCK. Release it to resume play. The game is over when you've used all three players or when time runs out.

Missing Pieces

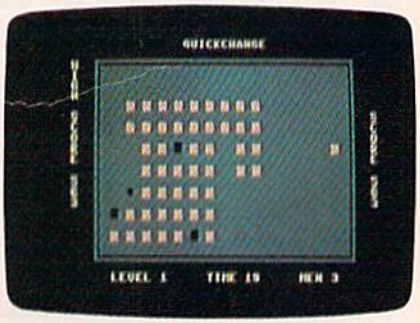
The play in this game is nearly identical to Flip Flop. But there's a



There's plenty of time to finish this screen in "Flip Flop."



In "Missing Pieces," you must avoid falling into the empty spots.



The squares disappear after you travel over them, making "No Turning Back" the most challenging variation.

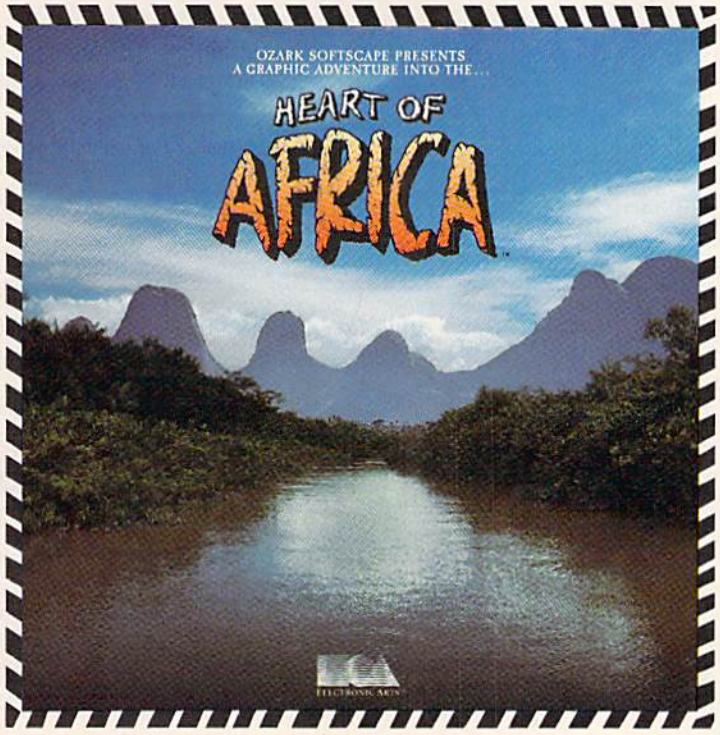
(Hi. I'm from Baltimore. Where's the pharaoh?)

A sequel to the Award-Winning Seven Cities of Gold.

Africa, 1890

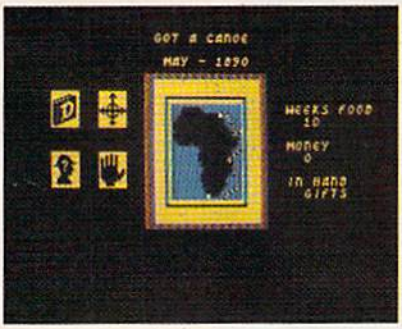
Up that river lies the African Adventure of your imagination.

The mysterious Dark Continent. Where the mighty Kilimanjaro towers over the Source of the Nile. Where the Congo snakes through steaming jungles and the scorching Sahara sun bleaches men's bones. Africa. Where legends of secret treasure drive men mad with desire. And where an adventurer can still find glory and gold...or a lonely death far from home.



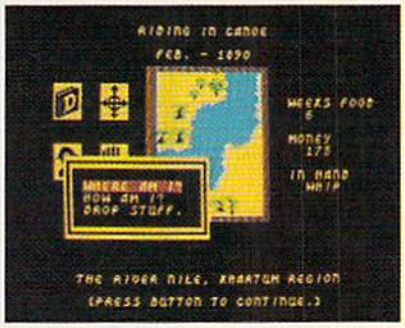
You have inherited a madman's diary ...and his dream to find the tomb of an ancient pharaoh.

Ancient songs still sung by tribal historians contain clues to the hidden tomb of a fabulously wealthy pharaoh. The madman's last feverish words drive you onward: "I now know it does exist. I am so close, but so near death. If you hear no more from me, then warn those that follow: this is not a journey for the weak of spirit or dull of mind. Come prepared."—H. Primm, May 21, 1889



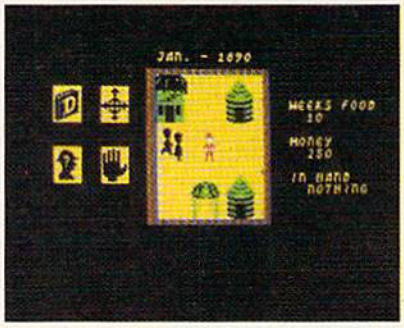
A Living Map of Africa

11 million square miles stuffed into your computer. Navigate 17 rivers. Hack through jungle and swamp. Sail to ten cities. Learn the ways of 22 tribes. Explore savannah, deserts and mountains. It's all geographically accurate.



Follow Your Dreams

Set your course and go for it. The computer automatically maps your progress and keeps your journal. If you get lost, it can tell you "The River Nile." What it won't say is "about to get sucked over the Kabelega Falls."



Decipher Native Clues

Local myths will help, if you can get the natives to talk. Enter their huts. Learn their customs. Pass out some bribes. The chief might tell you, "Look where the sun rises over the Childless Waters." Now try to figure it out.

ELECTRONIC ARTS™

Specifications: Available now for Commodore 64 & 128. Infinitely playable because the computer hides the tomb and treasure in new places each time you start. **How to order:** Visit your retailer or call 800-227-6703 for direct VISA or MasterCard orders (in CA call 800-632-7979). The direct price is $32.95. To buy by mail, send check or money order to Electronic Arts, P.O. Box 306, Half Moon Bay, CA 94019. Add $4 for shipping and handling. Allow 3-4 weeks for delivery. All E.A. products purchased direct have a 14-day "satisfaction or your money back" guarantee. For a complete catalog, send 50¢ and a self-addressed envelope to Electronic Arts, 2755 Campus Dr., San Mateo CA 94403.

COMPUTE!'s *Gazette Disk*

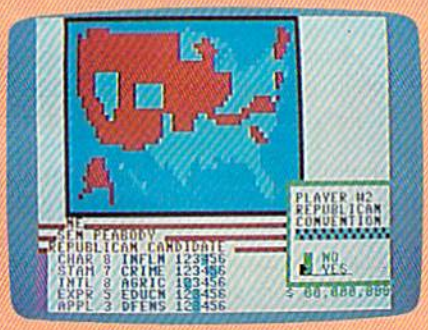
Now you can enjoy the exciting programs from *COMPUTE!'s Gazette* on a ready-to-run disk

Every month you can receive *COMPUTE!'s Gazette Disk*, which includes the fascinating and challenging programs published in the corresponding issue of *COMPUTE!'s Gazette*, ready to load on your Commodore 64 or VIC-20.

The 5¼-inch floppy disk will arrive in your home in time for you to enjoy the quality programs of *COMPUTE!'s Gazette* without having to type a single program.

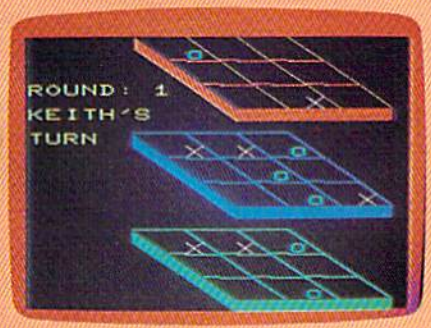
Timesaving

Using *COMPUTE!'s Gazette Disk* saves you time. Instead of spending hours typing in each program from *COMPUTE!'s Gazette*, you can load all the fun and fascinating programs in just a few minutes with the *Disk*. You have more time to enjoy Budgeteer, Mystery at Marple Manor, Vocab Builder, and many other exciting games and applications.



Inexpensive

And *COMPUTE!'s Gazette Disk* is inexpensive, only $69.95 for a one-year subscription. That means the *Disk* costs you $5.83 a month, a savings of 55 percent off the single disk price of $12.95. And what price can you put on the hours of typing time you save?

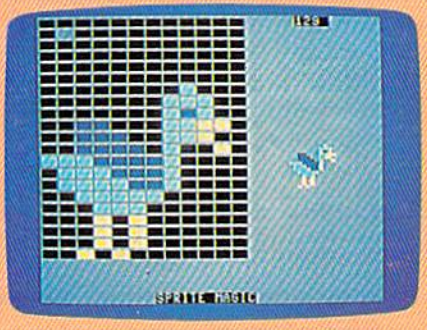


Risk-Free

All *Disks* are fully tested before they're shipped to you. And full documentation for all programs is in the corresponding issue of *COMPUTE!'s Gazette*. But if you should have a problem with a disk, just call toll free 800-334-0868 and a member of our Customer Service Staff will assist you.

Convenient

COMPUTE!'s Gazette Disk gives you access. As soon as you read about a new and challenging program in *COMPUTE!'s Gazette*, you can load the *Disk* and begin using it immediately—the *Disk* is ready when you are.



Enjoy the quality programs from *COMPUTE!'s Gazette* on the convenient, ready-to-use *COMPUTE!'s Gazette Disk*.

To order *COMPUTE!'s Gazette Disk*
Call toll free 800-334-0868 (in NC call 919-275-9809) or mail your prepaid coupon to *COMPUTE!'s Gazette Disk*, P.O. Box 10960, Des Moines, IA 50340

Individual issues of the *Disk* are available for $12.95 (plus $1.00 shipping and handling.) Call 800-334-0868 to order.

YES! I want to save time and money. Please enter my subscription to *COMPUTE!'s Gazette Disk*.

☐ Save 55% off the single issue price. 1 year subscription, $69.95

☐ Save even more! 2 year subscription, $129.95

All *Disk* orders must be prepaid.

☐ Payment enclosed (check or money order)
☐ Charge ☐ MasterCard ☐ Visa ☐ American Express

Acct. No. _____ Exp. Date _____
Signature _____
Name _____
Address _____
City _____
State _____ Zip _____
(Outside U.S. and Canada, add $36.00 per year for shipping and handling.)
Please allow 4–6 weeks for delivery.

35AD02

USE AISLE 12
4 DRIVE UNITS OR LESS
PREPAY ONLY!
NO CREDIT ON SERVICE WORK
NO MACHINE WITHOUT THE GREEN
PAY FOR 5 ALIGNMENTS GET 6TH ONE FREE
NOT RESPONSIBLE FOR MISSING FLOPPIES
BE POLITE
EVERYONE HAS TO WAIT
TAKE NUMBER
NOW SERVING
SAVE YOUR RECEIPTS
FREE VACUUM CLEANER WITH 200TH ALIGNMENT

Who needs this?

When you can solve disk drive alignment problems in 60 minutes with the CSM program.

Disk drive alignment problems?
Drive out of alignment again?
Tired of waiting two weeks or more to get your drive fixed??
WE HAVE THE ANSWER ! !

With the 1541 DISK DRIVE ALIGNMENT PROGRAM you can align the drive yourself in an hour or so. Not only that, you can do it at home AND no special equipment is required. Anyone with average mechanical skills can do it! !

Read What Compute!'s Gazette had to say. (Oct., 1984)

"... with 1541 Disk Drive Alignment *from CSM Software, you can fix it* [the disk drive] *yourself in an hour or so and the program will pay for itself the first time you use it...No technical expertise is required to accomplish the alignment procedures, and the manual accompanying the program thoroughly describes the procedures."*

1541 DISK DRIVE ALIGNMENT PROGRAM - VERSION 2.0 - *$44.95 plus shipping*

NUMERIC KEYPAD

FOR VIC and C-64

NO SOFTWARE REQUIRED

100% COMPATIBLE WITH ALL SOFTWARE

MORE FUNCTIONS THAN KEYPADS COSTING $79.95

7	8	9	*	
4	5	6	/	←
1	2	3	+	↑
0	.	•	—	DEL
ENTER		SH	↓	

$64.95 plus shipping

PROGRAM PROTECTION MANUAL FOR THE C-64 VOLUME II

Not just a third edition — a new and up-to-date manual covering the latest advances in program protection. Over 275 pages of valuable information. Topics include:

- *ENCRYPTION AND DECRYPTION*
- *UNDOCUMENTED OPCODES*
- *GCR RECORDING*
- *CUSTOM DOS ROUTINES*
- *CARTRIDGES AND EPROMS*
- *PROTECTING YOUR OWN SOFTWARE*
- *TIPS FROM EXPERTS ON PROTECTION, BACKUP & MORE*
- *DISK INCLUDED*

$34.95 plus shipping

NEW PRODUCT

★ SNAPSHOT 64™ ★

SNAPSHOT 64 is a new utility backup program that literally takes a 'SNAPSHOT' of your computer's memory. This snapshot is then saved to disk with an autoboot so that it may be easily loaded back in. It does all this automatically and easily.

- *EASY TO USE. TAKES ONLY 3-5 MINUTES*
- *BACKS UP MANY MORE PROGRAMS THAN SIMILAR UTILITIES*
- *SOLD FOR ARCHIVAL PURPOSES ONLY*
- *EXCLUSIVE FEATURE - ALLOWS YOU TO STOP MOST PROGRAMS AT ANY POINT, EXAMINE THE COMPUTER'S MEMORY, AND THEN RESTART THE PROGRAM. THIS IS A VERY VALUABLE FEATURE FOR THE HACKER!!*

$49.95 plus shipping

PROGRAM PROTECTION MANUAL FOR THE C-64 VOLUME I

- *A MUST FOR BEGINNERS*
- *THE PERFECT INTRODUCTION TO PROGRAM PROTECTION*
- *DISK INCLUDED*

$29.95 plus shipping

VISA AND MASTERCARD ACCEPTED

Shipping $3.50 per item in U.S.; foreign orders extra

C= is a registered trademark of Commodore Business Machines, Inc.

Available through your local software dealer or call:

CSM SOFTWARE, INC.

POST OFFICE BOX 563, CROWN POINT IN. 46307, PHONE (219) 663-4335

twist. Several pieces—randomly selected each time you play—are removed, thus creating empty spaces—*holes*. If you happen to leap into one while hurrying along, you lose one of your players. Unfortunately, the black squares are unaffected by these empty spaces. They move through them as if they weren't there.

The scoring and rules from Flip Flop apply to Missing Pieces.

No Turning Back

This is the most exciting—and most difficult—of the games. The playing board is the same as Flip Flop, but the object of the game is different. Once you move away from a square, it's erased. The goal is to eliminate the squares (you are credited with clearing the board if three or fewer remain).

Moving into an empty space is not allowed. But, unlike Missing Pieces, the black squares cannot move into the voids. They'll reverse direction if they encounter one of these spaces. This can be used to your advantage. You can cut off a black square by removing the squares horizontally adjacent to it. This will erase a black square and free up an entire row. For each black square removed, 100 points are added to your score (plus 1 point for the space previously occupied by the black square).

This game is trickier than the others. In haste, it's easy to isolate your own player. Remember, the object is to eliminate the squares, and you can't enter a voided space. Also, be aware that when you lose a player—provided it's not your last—your next player is positioned in the center of the screen. If there are no available pieces adjacent to the center, you've eliminated yourself from the game.

There's A Way To Win

The key to success in each of these games is to find the right pattern. There are several that will work. If you randomly move around the maze, you'll find that although you can accumulate points, you'll probably run out of time.

Quickchange may be played competitively for highest score or just for the challenge of completing a level or two.

See program listing on page 149.

"KENNEDY APPROACH..."

NEW SPEAKING SIMULATION
See and Hear All the Action!

"...This is UA 236...Emergency Fuel...one zero minutes!!!..."

Commodore-64 Screen Picture

Voice Communications coming in from all directions!! 20 Aircraft in the pattern, and now you have an EMERGENCY!! As "Kennedy Approach", YOU are in charge!! It's your job to get all these aircraft and passengers on the ground or on the way safely!! You'll really be glad when this shift is over!!

"Kennedy Approach" is the first "Speaking Simulation" that allows you not only to control the exciting action in the skies around some of our busiest airports but also to hear and communicate with the simulation aircraft using computer generated speech. Fast action, great aircraft control simulation, and outstanding graphics and sound make "Kennedy Approach" a must addition to your simulation software library!!

SEE YOUR LOCAL RETAILER for "Kennedy Approach". Available for Commodore-64 and Atari computers for suggested retail of only $34.95. For more information on all MicroProse products call or write.

CESSNA and MICRO PROSE

present the

Great American

LEARN TO FLY A REAL AIRPLANE

Contest

$30 OFF COUPON AND FREE FLYING LESSONS!!!

You get a coupon worth up to $30 towards a Cessna "Discovery Flight" in every flying simulation product box — Plus you can win a complete flight training course from Cessna. Details in every box, or see your local dealer.

Experience the reality of these other great simulations from MicroProse:

MICRO PROSE
SIMULATION • SOFTWARE

The Action is Simulated — the Excitement is REAL!!!

120 Lakefront Drive Hunt Valley, MD. 21030

301-667-1151

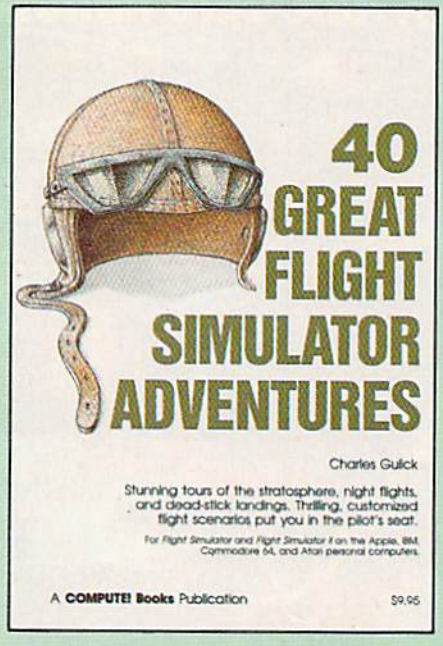
Commodore-64 and Atari are registered trademarks of Commodore Business Machines, Inc. and Atari Inc. respectively. Software Speech™ by Electronic Speech Systems of Berkeley, CA.

Discover the thrill of flying!

with COMPUTE! Books'

40 Great Flight Simulator Adventures

- Maneuver around the towers of the World Trade Center.
- Sightsee the Hudson River.
- Practice night flying and aerobatics.


40
GREAT
FLIGHT
SIMULATOR
ADVENTURES
Charles Gulick
Stunning tours of the stratosphere, night flights, and dead-stick landings. Thrilling, customized flight scenarios put you in the pilot's seat.
For Flight Simulator and Flight Simulator II on the Apple, IBM, Commodore 64, and Atari personal computers.
A COMPUTE! Books Publication
$9.95

40 Great Flight Simulator Adventures
Charles Gulick
Forty exciting, customized flight simulator scenarios put you in the pilot's seat as you fly over bridges, around skyscrapers, and land at mysterious airports. *Flight Simulator* (IBM PC) and *Flight Simulator II* (Apple II, Commodore 64, Atari) are two of the most popular games/simulations for personal computers. With this book, you can experience flight adventures from the moment you load the program. Parameters set up each flight and a running commentary describes what you'll see (and where to look to see it). Ranging from the simple and straightforward to the advanced and even mystical, these 40 flights will open a new dimension to an already outstanding program.
$9.95 ISBN 0-87455-022-X

Please send me _____ copies of *40 Great Flight Simulator Adventures* at $9.95 each.
(ISBN No. 0-87455-022-X)

All orders must be prepaid in U.S. funds.

Subtotal	_____
NC residents add 4.5% tax	_____
$2.00 shipping and handling charge per book.	_____
Total amount enclosed	_____

To order this exciting adventure guide, mail the attached coupon with your payment to COMPUTE! Books, P.O. Box 5058, Greensboro, NC 27403. Or call toll free 800-334-0868 (in NC 919-275-9809.)

☐ Payment enclosed (check or money order)
☐ Charge ☐ Visa ☐ MasterCard ☐ American Express

Name _____

Address _____

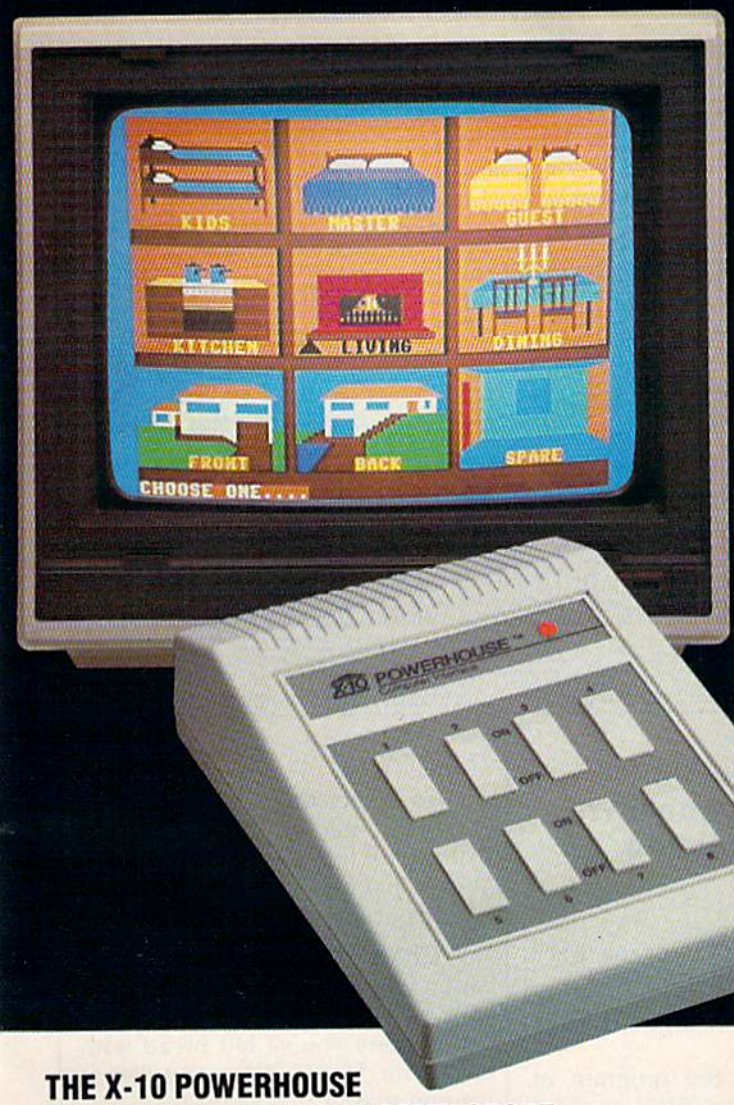
City _____ State _____ Zip _____

Please allow 4–6 weeks for delivery.

75D0222

COMPUTE! Publications, Inc.
One of the ABC Publishing Companies

COMPUTE! books are available in the U.K., Europe, the Middle East, and Africa from Holt Saunders, Ltd., 1 St. Anne's Road, Eastbourne, East Sussex BN21 3UN, England.



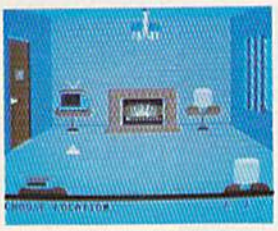
THE X-10 POWERHOUSE DOES EVERYTHING BUT PUT OUT THE CAT.

THE X-10 POWERHOUSE INTERFACES WITH YOUR COMMODORE TO CONTROL YOUR HOME...FOR SECURITY, COMFORT AND ENERGY SAVINGS.

This remarkable Interface lets you run your home through your Commodore 64 or 128 and a keyboard or joystick.

When you're away, it makes your home look and sound lived in. When you're home, it can turn off the TV at night and wake you up to stereo and fresh brewed coffee in the morning. It can even turn on your air conditioner and control your heating.

SPECIAL COLOR GRAPHICS MAKE PROGRAMMING A SNAP. You simply pick a room from the display screen. Use your keyboard or joystick to position graphics of lights or appliances. Then follow on-screen instructions to program any light or appliance to go on or off whenever you choose. You can even control thermostats, light intensity and more.



THE WAY IT WORKS. The X-10 Powerhouse Interface is cable-connected to the Commodore "User" port and plugged into a standard 110V outlet. After it is programmed, the Interface sends digitally encoded signals through your home wiring to special X-10 Modules. To control a lamp or appliance, you simply plug the electrical device into a Module

and then plug the Module into an outlet. The Interface can control up to 256 Modules throughout your home and won't interfere with normal use of lights and appliances.

There are plug-in Appliance Modules, Lamp Modules, Wall Switch Replacement Modules and Special 220V Modules for heavy duty appliances such as water heaters and room air conditioners. Plus Thermostat Controllers for central heating and air conditioning, Telephone Responders to control your home from any phone, and much more.

IT WON'T TIE UP YOUR COMPUTER. Use your computer only for programming. When you're finished, disconnect the Interface from the "User" port and keep it plugged into any convenient power outlet in your home. It will operate as a stand-alone controller with battery back-up and will run your home automatically.

SURPRISINGLY INEXPENSIVE. A Powerhouse System including the Interface, software and connecting cables costs less than $150. X-10 Modules are less than $20 each.

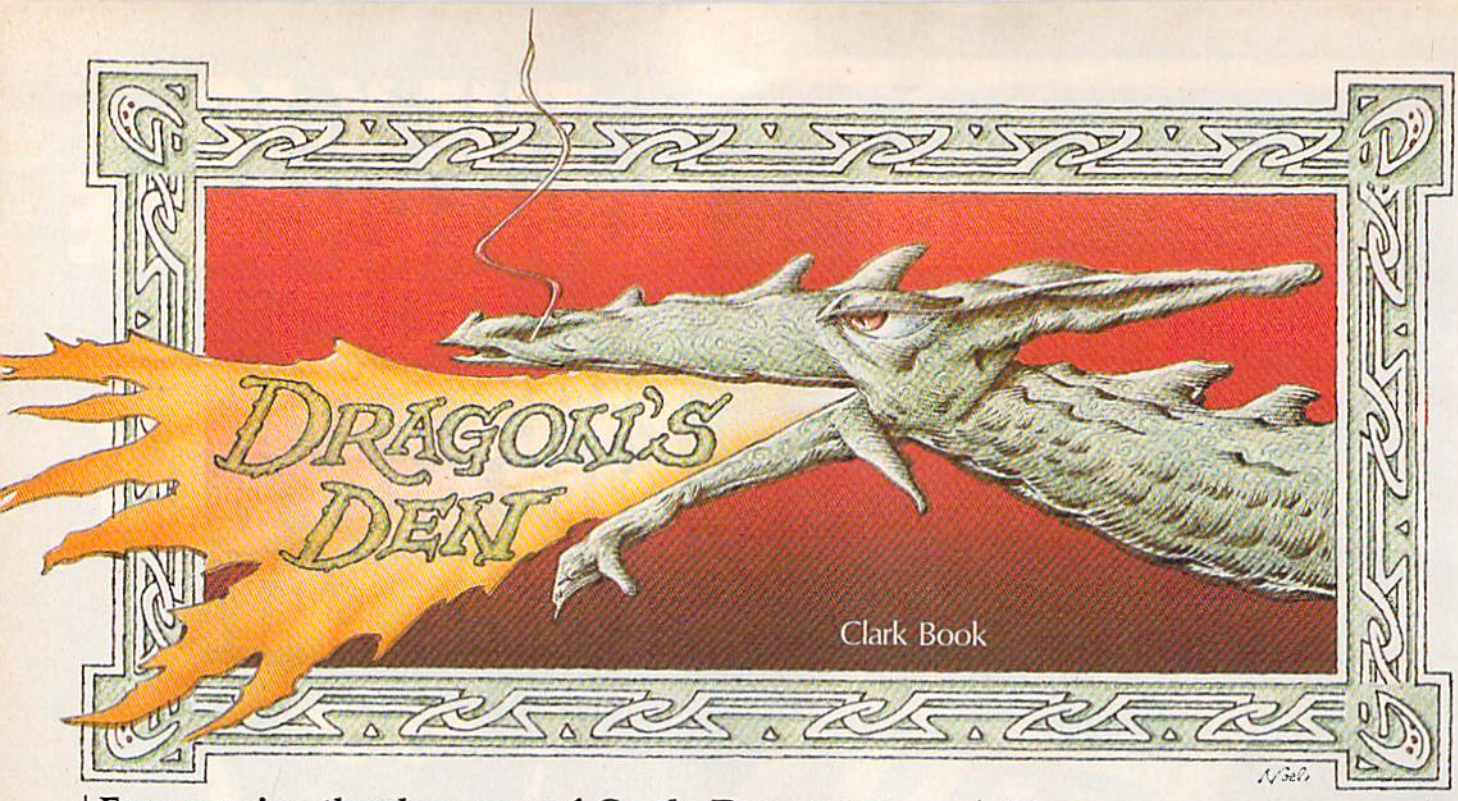
FOR THE X-10 POWERHOUSE DEALER NEAREST YOU, CALL TOLL-FREE: 1-800 526-0027

NEW JERSEY RESIDENTS CALL (201) 784-9700

X-10® POWERHOUSE

NUMBER ONE IN HOME CONTROL

Commodore 64 and Commodore 128 are registered trademarks of Commodore Int'l Ltd.



Few survive the dungeon of Castle Dunsmore. Enter this subterranean nightmare at your own risk. A strategy game for the Commodore 64, Plus/4, and Commodore 16.

Finding your way out of the dragon-infested dungeon of Castle Dunsmore is an unenviable task. The damp, soot-covered and blood-stained chambers are part of a dangerous labyrinth. If things don't go well, you could perish from lack of food or water. And if you're not quick on your feet, you could suffer a more horrifying fate at the jaws of a dragon.

How To Play

"Dragon's Den" is an all BASIC game for the 64, Plus/4, and 16. As listed, the program runs on the 64. If you have a Plus/4 or 16, substitute this line:

```
100 Y=826:COLOR 4,1:COLOR 0,1:
    PRINT"{CLR}{5 DOWN}{5}
    {7 SPACES}D R A G O N ' S
    {3 SPACES}D E N"
```

After typing the program in, save a copy. Type RUN to play. First, a message appears to tell you that the maze is being drawn. After a short pause, you find yourself in a chamber somewhere in the dungeon of the castle. (Each time you play, you start in a randomly selected chamber.) The screen presents a three-dimensional perspective of the room and a directional marker indicating which way is north. At this point, you're given several choices of commands at the bottom of the screen.

To select one of these, press the first letter of the appropriate word (L for left, for example). You'll always have at least four of these options at any point in the game:

Chart: Shows your present location within the castle dungeon as well as where you've been. Indicates where you've left bread with an M (for Mark). Press any key to resume play.

Mark: Deposits a bread slice in the current chamber. A message appears to indicate how many bread slices you've used (you begin with 20). By leaving bread, you can mark any chamber for future reference. If you leave all 20 slices, however, you starve to death.

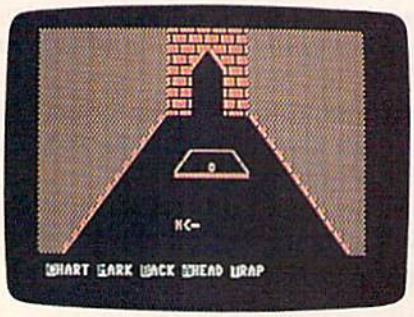
Back: Moves you to the chamber opposite the direction you are facing, like taking a step backwards.

Left: Moves you to the chamber on your left (a door appears only if there is an entrance to the chamber).

Ahead: Moves you to the chamber directly in front of the one you are currently in (a door appears only if there is an entrance to the chamber).

Right: Moves you to the chamber on your right (a door appears only if there is an entrance to the chamber).

Trap: Lifts the trap door. You could find a magic sword that slays



Will there be treasure, water, or a dragon under the trap door? You're faced with a number of choices in each room in Dragon's Den. In the photo on the right, the player has pressed C (Chart) to find his present location as well as where he's been.

FEEL WHAT IT'S LIKE TO BE IN THE FIELD OF FIRE.

When you play FIELD OF FIRE™, you'll lead one of the finest fighting forces of World War II — Easy Company of the First Infantry Division — into eight historical battles.

Dividing your company into fireteam units of six men, you'll engage in such exciting combat as a night raid in North Africa, the storming of Omaha Beach on D-Day, or a defensive delaying action in the Battle of the Bulge — all against German forces controlled by your cunning computer.

Special attention has been paid to the Hi-Res graphics and lively sound effects. Realistic rules cover every aspect of the fighting: Line-of-sight, hidden movement, weapons ratings. Even your soldiers' abilities will improve through time.

To experience the heart-pounding thrill of commanding these heroic men, run to your nearest game or computer/software store today!

If there are no convenient stores near you, VISA and M/C holders can order this $39.95 game direct by calling 800-227-1617, ext. 335 (toll free). In California, call 800-772-3545, ext. 335. Please specify computer format and add $2.00 for shipping and handling.

To order by mail, send your check to: STRATEGIC SIMULATIONS, INC., 883 Stierlin Road, Bldg. A-200, Mountain View, CA 94043. (California residents, add 7% sales tax.) All our games carry a "14-day satisfaction or your money back" guarantee.

WRITE FOR A FREE COLOR CATALOG OF ALL OUR GAMES.

On diskette for COMMODORE 64™ and 48K ATARI® home computers. APPLE® version coming in fall '85.

©1985 by Strategic Simulations, Inc.

COMMODORE 64, ATARI, and APPLE are trademarks of Commodore Electronics, Ltd., Atari, Inc., and Apple Computer, Inc., respectively.

"TYPING TUTOR III is the best typing instruction program for personal computing that I have seen."

Erik Sandberg-Diment
The New York Times 1/8/85

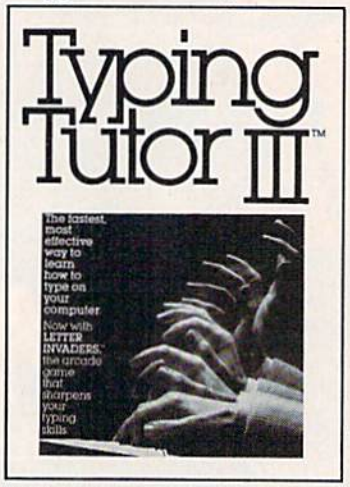
Your computer productivity is directly proportional to your speed at the keyboard. That's why *Typing Tutor III™ with Letter Invaders™*:

☐ Automatically adjusts to your abilities and progress;

☐ Tests words, numbers, and full keyboard, as well as through a standard speed test;

☐ Features *Letter Invaders*, an arcade-style game that lets you take an entertaining break while sharpening your typing skills at the same time.

For the IBM PC, PC jr, XT, AT, ($49.95*); Apple II Series ($49.95*), Macintosh ($59.95*); and Commodore 64 ($39.95*) wherever software is sold. (*Suggested Retail)


Typing Tutor III™
the fastest, most effective way to learn how to type on your computer
Now with LETTER INVADERS: the arcade game that sharpens your typing skills

BY KRIYA SYSTEMS,™ INC.

SIMON & SCHUSTER

Typing Tutor III, Letter Invaders, and Kriya Systems, Inc. are trademarks owned by and licensed from Kriya Systems, Inc.

Simon & Schuster
1230 Avenue of the Americas
New York, NY 10020

Little People Inside Your Computer:

How To Make Contact

We've known for some time that small human-like beings live inside your computer. No news there. What *is* news is that Activision scientists—the same crack research team that first made contact with the little guys—have now made it possible for Commodore 64/128 and Apple II series owners to meet the inhabitants of their computers.

Yes, the most amazing scientific quest of modern times can now be duplicated in the comfort of your own home, thanks to The Activision Little Computer People Discovery Kit.™ But first, for those who've been vacationing on Mars, a little more background.

Little Computer People (LCP), of course, are the ones responsible for that thousand-digit error in your phone bill, for that police officer mistakenly believing you haven't paid your parking tickets, for the syntax errors you get back after you've fed your computer a perfectly good piece of code.

Turns out, the little folk only cause all that mischief because they feel neglected. Treated properly, they're as pleasant and sociable as you or me.

Thanks to the revolutionary "house-on-a-disk" perfected by Activision scientists, LCP can now be lured out of the circuit boards and into the light of day. And fascinating things are being learned.

They seem to have quite a bit to say. They'll tap on the inside of your monitor screen until they get your attention, then pound out messages on their typewriters. They also enjoy playing songs, dancing and playing card games.

Though they share many common traits, the little folk are as individual as Big Regular People (BRP). Consequently, Activision researchers consider it vital that as many computer owners as possible use The Activision Little Computer People Discovery Kit to meet as many LCP as possible. The Discovery Kit includes The Little Computer People™ House-On-A-Disk™ Research Software that is guaranteed to lure out an LCP; the computer owner's guide to the care of, and communication with, Little Computer People; deed of ownership for the House-On-A-Disk; and a special edition of *Modern Computer People* magazine—all the tools needed for observation, interaction, communication and, perhaps, a meaningful relationship.

We recommend that you join the quest immediately. Unless you *like* being the victim of all those "computer errors."

©1985 Activision, Inc.

a dragon, or gold, or water. Or you may be unlucky enough to unleash a lurking dragon.

Making The Right Moves

The main goal of Dragon's Den is to escape from the dungeon of Castle Dunsmore. The secondary goal is to escape with as much gold as possible. (If you wish to play competitively, take turns and see who can gather the most gold pieces.)

You need to find an exit. By regularly checking your position with the Chart command, you can monitor your progress. The exit is on an outer wall. In your haste to find your way out, don't forget to nourish yourself. It's tempting to hurry through the castle dungeon in search of an exit, while avoiding trap doors. But it's risky. You could run out of food if you leave all your bread slices, or run out of water, which is sometimes found under a trap door.

It's possible that you could escape from the castle dungeon without ever lifting a trap door. But it's not likely. Since water can be found under the trap doors, you'll need to open them. Also, if you're playing to collect as much gold as you can, you'll want to open most, if not all, trap doors. You run the risk of encountering a dragon every time you open a trap door. If a dragon appears, one of three things can happen: you slay him *if* you have a magic sword (found occasionally under a trap door), you evade him by running, or you become a quick lunch.

When you press T (for Trap), the door opens. If you see a pair of beady eyes, you have about two seconds to run. Press one of the movement keys (Left, Ahead, Right, or Back) immediately. But be sure to press one which corresponds to an exit. For example, if you hastily press R and there is no door to the right, the game ends in a rather unappetizing manner. You're then asked if you wish to play again.

When you make it to an exit, you have the option of leaving the castle (ending the game) or hunting for more gold. Those who are playing to collect the most gold may stay in the castle and search for more. There is no time limit.

See program listing on page 146.

Fly the unfriendly skies.

3D, scrolling flight simulation w. air-air & air-ground combat.

On-board computer, working gauges & 3 weapon systems.

3 skill levels, 15 scenarios, long-playing strategic depth.

You're in the cockpit of a dream machine—a bad dream for the poor sap whose tail you're waxing. You stick a silver bird up his exhaust and wince as he blossoms into fire. And then you rain down like pestilence upon the grunts in the tanks.

Skyfox. It's the fastest-selling EA game in history. It has the most awesome, high-speed animation you've ever seen on your computer. It's played to rave reviews in every magazine. And it's yours—at your retailer—or direct from EA at (800) 227-6703 with a 14-day satisfaction or money-back guarantee.

SKYFOX™

from ELECTRONIC ARTS™

ORDERING INFORMATION & MACHINE AVAILABILITY: Visit your retailer or call (800) 227-6703 (in CA call (800) 632-7979) for VISA or MasterCard orders. To purchase by mail, send check or money order to Electronic Arts, P.O. Box 306, Half Moon Bay, CA 94019. Add $3 for insured shipping & handling. Indicate machine verson desired. Allow 1-4 weeks for delivery. Apple II family available now at $39.95. C-64 available now at $34.95. For a copy of our complete catalogue and direct order form, send 50¢ and a stamped, self-addressed envelope to Electronic Arts, 2755 Campus Drive, San Mateo, CA 94403.

Doug Smoak

Make your own custom banners with this flexible and easy-to-use program. For use with Commodore and Commodore-emulating printers. Versions for the 64, Plus/4, 16, and VIC-20.

Put your computer and printer to creative use with this short BASIC program. "Banners" is flexible and easy to use. It's menu driven, and it allows you to select the height and width of the characters that comprise your banner. The program also allows you to print out custom (redefined) characters, such as foreign language letters, and special math or scientific symbols.

Selecting From The Menu

Type in the appropriate version for your computer—Program 1 for the 64, Program 2 for the VIC-20, and Program 3 for the Plus/4 and Commodore 16. After saving a copy, load and run the program. Be sure your printer is turned on and the device number set to 4. You're first presented with three choices: U (uppercase and graphics), L (upper/lowercase), or C (custom character set). After pressing one of these letters, you're asked to choose which character you wish to use to fill in the large letters for your banner (see the accompanying figures for an example). You'll find that certain characters make lighter or darker banner letters.

The next prompt asks for your message. Type it in from the point where the cursor appears (do not cursor left before starting). Your message can go up to two screen lines. After typing a word or message, press RETURN. The next prompt asks how tall your letters should be and offers a choice of 1–9. The smallest size (1) is the height of seven normally printed characters. Choosing 2 yields a letter 14 characters high, 3 a letter 21 characters high, and so on up to 9, which is 63 characters high.

Next you're prompted for the width. The maximum width allowed is determined by the number you pressed for height. If you chose 9 for height, you'll have a choice of 1–9 for width. If you chose 4 for height, you'll have a choice of 1–4. After selecting a width, the printing begins. When the banner is complete, you're asked to press X (to exit the program), R (to reprint the message), or N (to enter a new message).

Helpful Hints

Remember that larger letters take more time to print. So if you have more than one message to print, you might consider smaller letters. This is important if you're making banners for children or if people are taking turns. Also, consider that the "blocky" look of the letters is more obvious in the larger sizes unless they're to be viewed from a distance.

Modifications For The 1526 And MPS-802

The programs should work as is on the 1525, MPS-801, and MPS-803 (if you have a non-Commodore printer, make sure the interface is set to emulate a Commodore printer).

Line spacing is handled a little differently on the 1526 and 802 printers, so you'll have to make some minor changes. First, add this line at the beginning of the program:

```
1 OPEN 6,4,6: PRINT#6, CHR$(27):
  CLOSE6
```

This adjusts the spacing between lines to 27/216, or eight lines per inch. If you want the characters closer together, use a smaller number in the CHR$ function. For more space, insert a larger number.

Next, change CHR$(8) to CHR$(32) in lines 360 and 390 (lines 340 and 370 of the VIC version).

Using Custom Characters

Each version of "Banners" allows you to print out your own custom characters. If you're a seasoned programmer, you've probably worked with custom characters before. If you're new to programming and interested in learning how to create your own custom characters, refer to the *Commodore 64 Programmer's Reference Guide* (pp. 108–114) or any of the following COMPUTE! books: *Creating Arcade Games on the 64, Commodore 64 Graphics, COMPUTE!'s First Book of Commodore 64, COMPUTE!'s First Book of Commodore 64 Sound and Graphics, COM-*

Figure 1

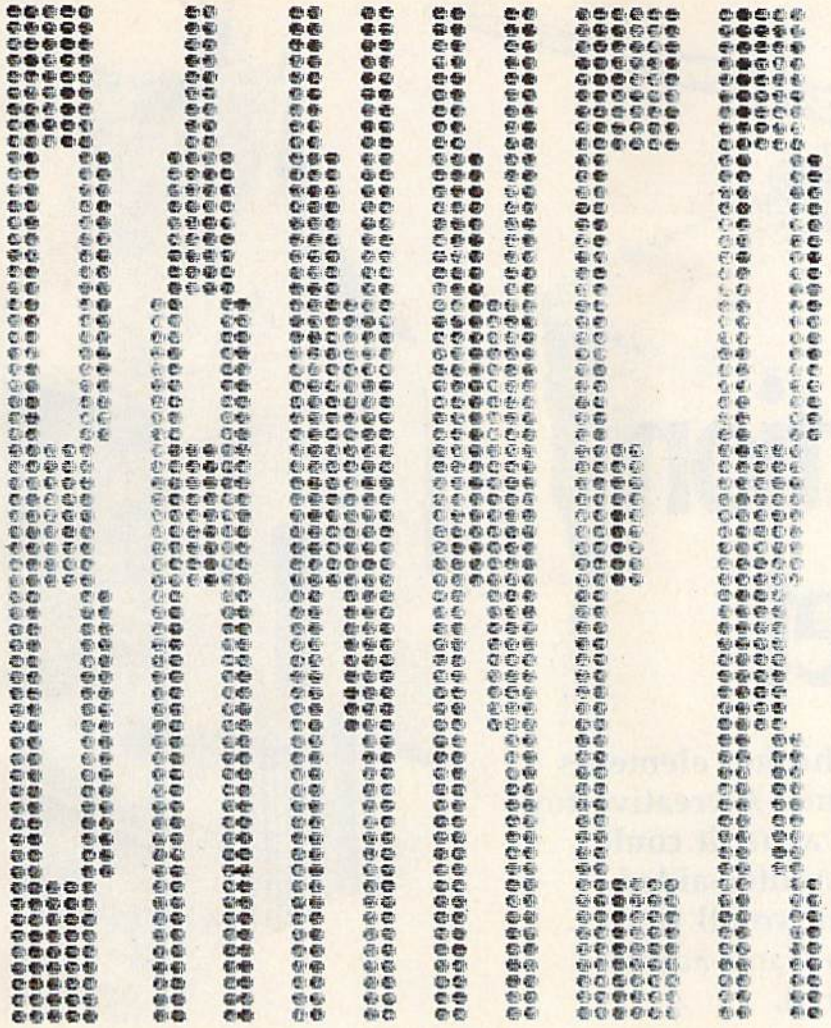


Figure 2

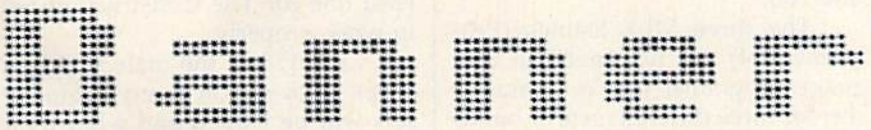
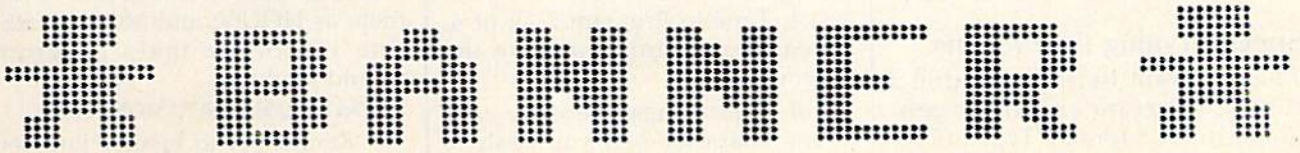


Figure 3

Figure 4



PUTE!'s First Book of VIC, or *COMPUTE!'s Second Book of VIC*. If you have a Plus/4 or Commodore 16, refer to the *Programmer's Reference Guide for the Commodore Plus/4* (Scott Foresman & Company, 1900 East Lake Ave., Glenview, IL 60025). Commodore 16 owners can use the technique described in the Plus/4 reference guide.

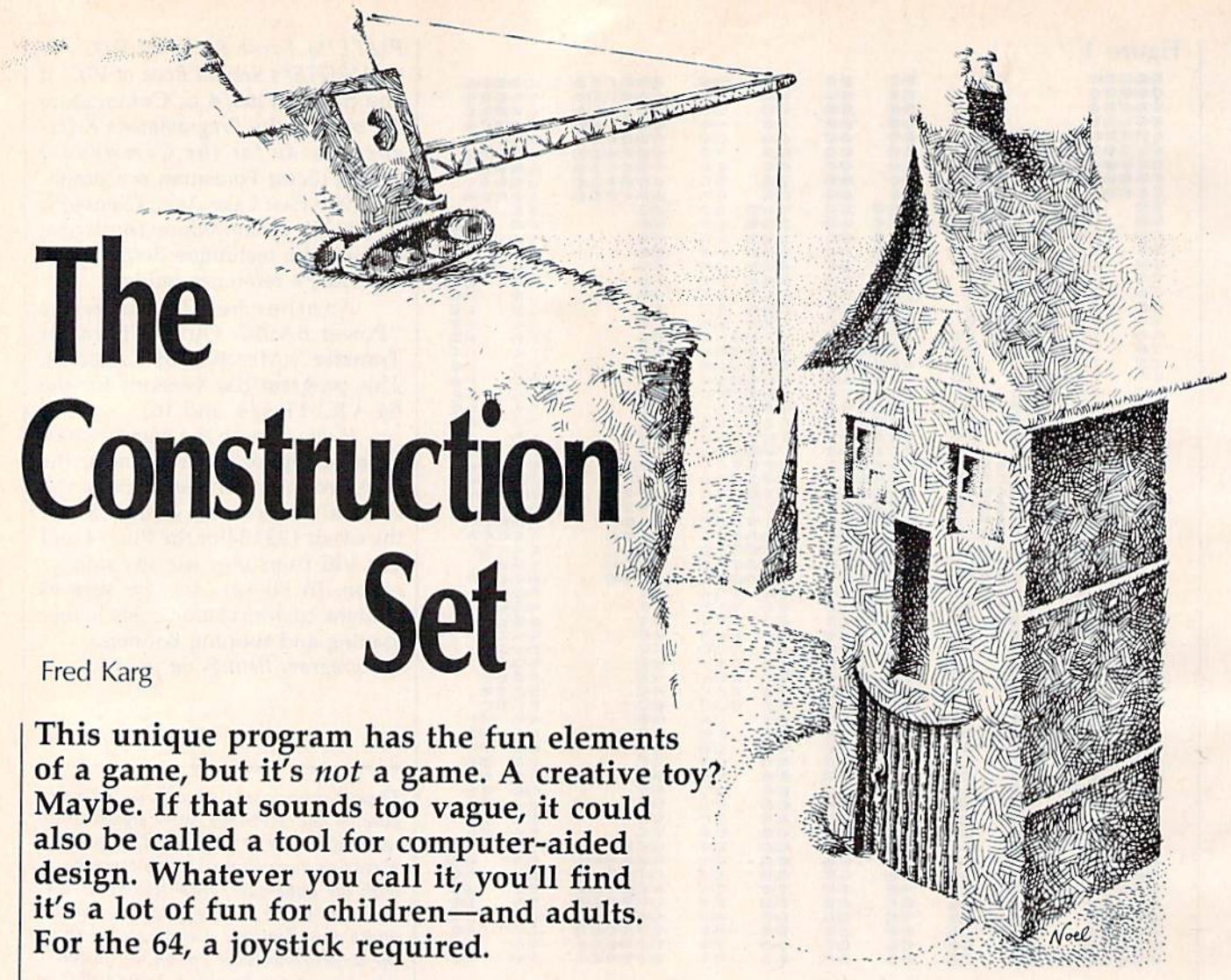
Another helpful source is "Power BASIC: Quick Character Transfer" (March 1985 GAZETTE). This program has versions for the 64, VIC, Plus/4, and 16.

If you choose the custom character set option with Banners, the menu will remind you to locate the custom character set at 12288 (for the 64) or 13312 (for the Plus/4 and 16). VIC users may use any safe location. In all versions, be sure to load the custom character set before loading and running Banners.

See program listings on page 151.

---

*These banners, created with a Commodore 64 and MPS-801, were significantly reduced in size so they could fit on a magazine page. Figure 1 was created with the uppercase/graphics option, a • character (SHIFT-Q), a height of 9 and width of 1. Figure 2 was created with the upper/lowercase option, a * (asterisk) character, a height of 2 and width of 2. Figure 3 uses the same options as figure 1, except the height is 3 and width is 2. The border figures are graphics heart characters (SHIFT-S). Figure 4 was created with the custom character option, graphics heart characters, and a height and width of 2.*



The Construction Set

Fred Karg

This unique program has the fun elements of a game, but it's *not* a game. A creative toy? Maybe. If that sounds too vague, it could also be called a tool for computer-aided design. Whatever you call it, you'll find it's a lot of fun for children—and adults. For the 64, a joystick required.

All our lives we build things, often just for the fun of it. Toddlers play with building blocks. Grade schoolers create elaborate structures with Tinker Toys, Lego blocks, and Erector sets. Teenagers put together model cars and planes. Adults have basement workshops for making things out of wood. Even the process of writing a computer program can be described as building something from parts.

"The Construction Set" is unlike most other computer programs. It can hold up to four different sets of building blocks which can be combined easily in any way you like. No one wins or loses and there's no high score. But it's great fun to create your own interesting picture.

Special Typing Instructions

The program listings include a BASIC program and three programs in MLX format. Type in Program 1 (The Construction Set Main Program) first. Datassette owners should change **DI=8** to **DI=1** in line 160.

The three MLX listings (Programs 2–4) are not machine language programs; they're character sets for three different sets of building blocks. Follow these directions to create each of the character sets:

1. Load but don't run the MLX entry program (found elsewhere in this issue). If you haven't used it before, be sure to read the directions carefully.

2. Enter **POKE 55,0: POKE 56, 64: CLR**.

3. Type RUN and answer the prompts:

Starting Address: 28672
Ending Address: 30723

4. Type in Program 2, 3, or 4. When you've finished, save the program.

5. Repeat these steps for each of the character sets you wish to use.

You don't have to type in all of the character sets, but you need at least one for The Construction Set to work properly.

Line 170 of the main program keeps track of how many character sets will be loaded and what their names are. Currently, it's set up for 3. If you enter only one or two sets of building blocks, change the 3 to a 2 or 1 and follow it with a comma and the name you used to save the character set file.

Tape users should be especially careful with line 170. Save all of the character sets to the same tape, one after another. Remember which one was saved first and make sure that filename is the first in line 170. For example, if you typed in and saved the first two sets, and saved them as HOUSE and MONSTERS, line 170 of the main program should read:

```
170 DATA 2,"HOUSE","MONSTERS"
```

Remember to modify line 160 as well.

THERE'S NO BEATING MASTERTRONIC!

With **Commodore 64/128** diskettes at an amazingly low price of $9.99 Mastertronic brings you "top quality programs at a price that everyone can afford."

Ask for Mastertronic programs at your local dealer **NOW!** or contact the Mastertronic hotline by calling (301) 695-8877

·MASTERTRONIC·

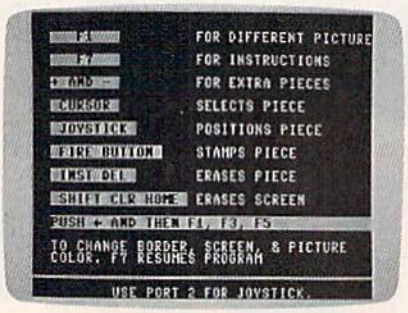
Mastertronic International Inc.
7311B Grove Road, Frederick,
Maryland 21701

Putting Together A Picture

When you first load and run The Construction Set, you'll see the menu of commands on screen while the program loads the character sets.

Any time you want to check the menu, press f7 and the list of commands will appear (press f7 to go back to the work area).

The work screen is divided into two parts. At the bottom, you should see several building blocks. A pointing hand symbol floats above the blocks. Use the cursor keys (left and right) to move the hand back and forth to select the block you wish to place on the screen. Press the plus and minus keys to see more building blocks in the same set. Some blocks are full size, others are shorter.



Press f7 for the complete list of commands.

The top part of the screen is the work space. At first the screen is blank, except for a window (a hollow rectangle). With a joystick in port 2, move the window around the screen. Then press the joystick fire button to place a building block on the screen in the same position as the rectangle. To erase it, tap the INST/DEL key. Whichever block the hand is pointing to at the bottom of the screen is the one that's stamped on the screen.

The process of creating a design is fairly easy. First move to the set of blocks you want with the plus and minus keys, then use the cursor keys to move the hand to the pattern you want. After selecting a block, position the window and press the fire button. Patterns can be repeated as often as you like.

If you forget the commands, press f7 to see the menu. If you want to start over, clear the screen by pressing the shifted CLR/HOME key.

When you're finished, you can experiment with different colors for different parts of the screen. Press the left-arrow key (right above CTRL) and then one of the following keys.

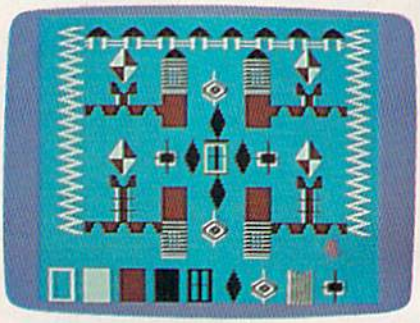
(←) f1: Change border color.
(←) f3: Change screen color.
(←) f5: Change character colors.

Four Character Sets, Four Screens

The Construction Set has room for four different character sets. Each defines a set of building blocks. The three accompanying the program are "House" for making brick buildings, "Creature" for putting together people (and monsters), and "Shapes" for abstract patterns. These custom character sets were created with "Ultrafont +" from the July 1984 GAZETTE. You can create your own Construction Set building blocks if you have a copy of Ultrafont +. You could invent building blocks for electronic circuits, quilts, landscapes, flags, or a variety of other patterns.

Each set of building blocks has its own screen. You can travel between the workspaces of each of the character sets by pressing f1 (as mentioned above, if you press the left-arrow key first, f1 changes the border color). The pictures you've created are preserved when you switch back and forth. So if you press f1 four times, you'll come back to the screen where you started and the picture will still be there.

People and monsters built from the Creature Character Set.



Diamonds, blocks, and zig-zags from the Shapes Character Set.

The House Character Set with its doors, windows, and walls.

An interesting modification for children is to load the same set of building blocks into all four workspaces. For example, you could change line 170 to **170 DATA 4, "CREATURE","CREATURE","CREATURE","CREATURE"** (tape users will have to use MLX to save the Creature font four times in a row on a single tape). Then have the child make up a story and build four pictures to illustrate the plot. When the characters have been put together, use f1 to step through the pictures as the child tells the story.

See program listings on page 152.

UNLOCK YOUR DATA!
with
DiskEdit 64™
(For the C-64® and 1541® or compatible drive)

* 100% Machine Language program power dedicated to your disk editing needs.
* No need to type filenames; just scroll through the directory, pick a file to analyze, then press RETURN.
* Find program Start and Finish addresses in a flash! (only 20 seconds for a 10K program) Lists all program Track and Sector numbers.
* Sector data displayed in Decimal Notation for Editing; also displayed as printed and poked characters. Sets 1&2
* Create BASIC Data Statements from Machine Language data stored on disk; all automatically!
* View and Edit Block Maps; Allocate sectors yourself.
* Restore "Scratched" Files immediately.
* Print out file and sector information.
* Access Printers 4 & 5, and Disk Drives 8, 9, 10, & 11.
* Seven "Help Screens" included for quick reference.

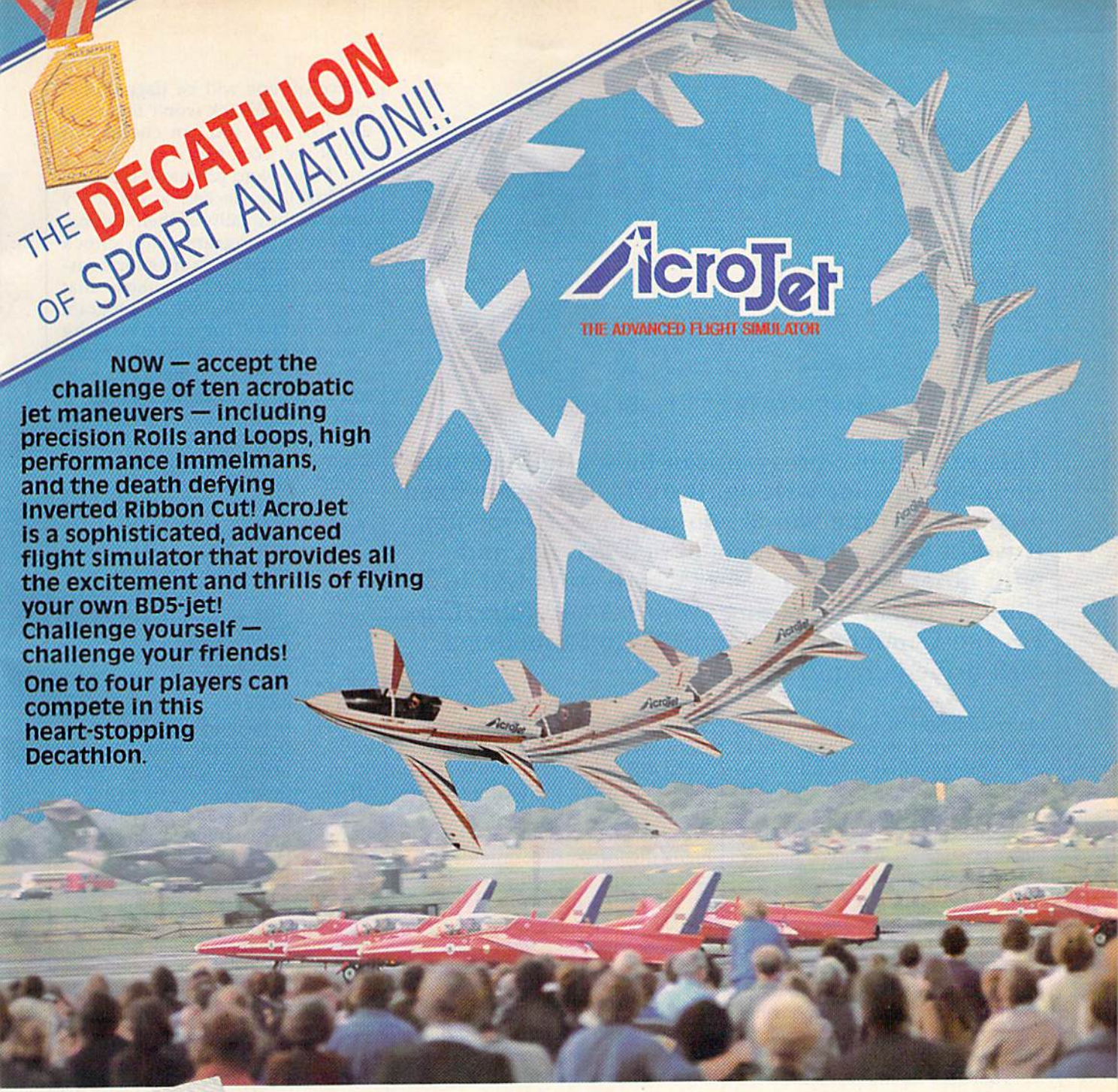
DiskEdit 64 diskette now ONLY $15.00
(Data Print-Out Samples: $2.50)
Send Check or Money Order to:
LIDON Enterprises
P.O.Box 773
Elm Grove, WI 53122

THE DECATHLON OF SPORT AVIATION!!

AcroJet

THE ADVANCED FLIGHT SIMULATOR

NOW — accept the challenge of ten acrobatic jet maneuvers — including precision Rolls and Loops, high performance Immelmans, and the death defying Inverted Ribbon Cut! AcroJet is a sophisticated, advanced flight simulator that provides all the excitement and thrills of flying your own BD5-jet! Challenge yourself — challenge your friends! One to four players can compete in this heart-stopping Decathlon.

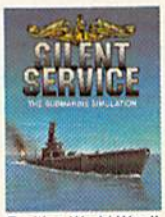


AcroJet is now available for Commodore 64/128 computers for a suggested retail of $34.95. Coming soon for the Apple II family, IBM PC/PC Jr., and Atari XL/XE. Call or write for specific machine availability, and for MC/VISA orders.

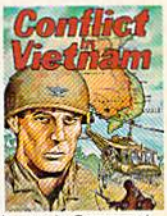
COMMODORE 64/128, ATARI, APPLE, and IBM are registered trademarks of Commodore Business Inc., Atari Inc., Apple Computer Inc., and International Business Machines Inc., respectively.

Experience the reality of these other great simulations from MicroProse:

Daring Attack Helicopter Action in the AH-64 APACHE!



Exciting World War II Submarine Action in the Pacific!



You are in Command — Dien Bien Phu to the Fall of Saigon!

MICRO PROSE

SIMULATION • SOFTWARE

120 Lakefront Drive Hunt Valley, Maryland 21030 301-667-1151

AcroJet and other exceptional simulations from MicroProse are available at Sears, K Mart, and other fine distributors of computer software.

SpeedCheck

An Expandable Spelling Checker For The Commodore 64 And 128

Ottis R. Cowper, Technical Editor

This easy-to-use program can help eliminate misspellings in your writing. It builds a personalized dictionary of the words you use most frequently. It works with all versions of *SpeedScript*, and with other word processors which store text in a similar format, including *WordPro* and *PaperClip*. For the Commodore 64 and 128 (in 64 mode); a disk drive is required.

Many commercial word processing programs include spelling checkers—programs that search for misspellings in documents created with the word processors. Since the initial debut of *SpeedScript* in January 1984, COMPUTE!'s GAZETTE has received hundreds of requests for a compatible spelling checker. Now there's "SpeedCheck."

SpeedCheck examines your documents word-by-word, comparing your typing with entries in its dictionary. What distinguishes this program from other spelling checkers is that it's *interactive*. You see your text on the screen as it's being checked. Words that aren't found in the dictionary are highlighted, so you can correct any misspellings immediately. SpeedCheck also highlights correctly spelled words if they aren't already in its dictionary. These new words can then be added with the touch of a single key.

Commercial spelling checkers come with prepared dictionary disks containing many thousand words. SpeedCheck can't match that—at least not at first. You start with a blank dictionary disk and add words as you go along. This means that SpeedCheck may be a bit tedious the first few times you use it, since you'll have to add many words. However, you'll soon build a customized dictionary disk that contains all the words you use most often.

The 664 available blocks on a blank dictionary disk provide room to add over 168,000 characters—enough, for example, for over 24,000 seven-letter words. *Note to* GAZETTE DISK *subscribers: The December* GAZETTE DISK *includes a SpeedCheck dictionary with nearly 2,000 words to help you get started. The disk menu includes a file with instructions on how to copy the dictionary to your own disk.*

Save Your Dictionaries

Let's clear up some common misconceptions about spelling checker programs before you discard your dictionaries and grammar books. Like most such programs, SpeedCheck can be deceived. If you type *form* when you mean *from*, SpeedCheck cannot detect the mistake if both words are in your dictionary. SpeedCheck makes no judgment about context; as far as it's concerned, *form* is a correctly spelled word. There's a way around this problem, though. If you frequently misspell *from* as *form*, just don't add *form* to the dictionary disk. Each instance of *form* will be flagged, because SpeedCheck won't find it on the disk, and you can check your use of the word *form*.

Many word processor users expect spelling checkers to magically improve the quality of their writing. However, programs that check grammar and syntax are enormously more complex than those that simply check spelling. A program that checked for good writing would approach artificial intelligence. While SpeedCheck can help you eliminate misspelled words, it can't make you a better writer.

Also, remember that SpeedCheck is *not* a word processor. Although the program allows you to correct spellings and make minor changes, it's not suitable for major editing tasks. That's what your word processor is for. SpeedCheck works especially well with *SpeedScript 3.0*, the version published in the March 1985 issue of COMPUTE!.

If you have *SpeedScript 3.0*, you can exit the word processor and load SpeedCheck without losing the text in memory. You can also exit SpeedCheck and reload *SpeedScript* 3.0 without losing text. Most other compatible word processors—including *SpeedScript* versions 1.0 (COMPUTE!'s GAZETTE, January 1984) and 2.0 (GAZETTE DISK, May 1984)—clear the text area when run, so you must load the document to be checked into SpeedCheck, then save a corrected version after checking.

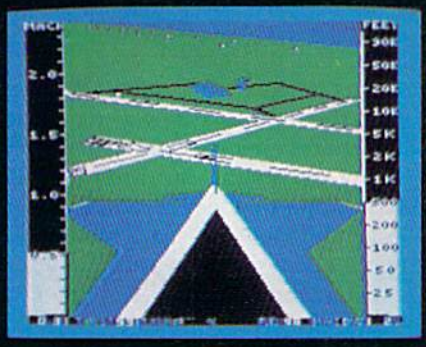
With minor modifications (explained below), SpeedCheck can also check documents from any word processor that stores characters in the same format as *SpeedScript*: as screen codes in program files. This includes the popular *WordPro 3 Plus/64* and *PaperClip* programs, but excludes those word processors that store text in sequential files, such as *Easy Script*.

For World-Class Misspellers

A price had to be paid to keep SpeedCheck short (it's only 2.6K) and simple, and to minimize the speed constraints of the 1541 disk drive. For one thing, SpeedCheck checks the spelling of only those words which have five or more characters, but this can easily be changed to any value you desire (more on this below).

F-16 Dogfight with Enemy MiG-23 Fighters

F-18 on the Deck of a Nimitz-Class Aircraft Carrier (Control Tower View)



F-16 High-G Pullout over Detailed Wargame Scenery (Rear View)

Jet

From the author of Flight Simulator II comes a new dimension in realism. Jet simulates two fast and maneuverable supersonic jet fighters, a land-based F-16 or a carrier-based F-18. The simulator includes modern electronic flight instrumentation and the most advanced weaponry available. Jet's simulation sophistication, combined with excellent visual attitude references, makes it truly enjoyable to fly.

Easy aircraft control coupled with ballistic thrust gives you the kind of aerobatic maneuverability only a modern jet fighter can provide. Jet's attitude indicator is easy to read no matter what your orientation. A full-screen out-the-window view helps you get the most out of Jet's excellent flight controls. And that's a major consideration when flying at speeds in excess of 1300 MPH.

With Jet you can fly through either structured or non-structured environments. Engage in a deadly variety of combat missions. Explore the wargame territory, or relax by practicing precision aerobatic maneuvers. Load in scenery from optional United States Scenery Disks. You can even load in scenery off the Flight Simulator II disk.

New high-performance graphic drivers provide beautifully detailed scenery in either day or night-flight modes. You can look forward, left, right, rearward, or straight up out of the cockpit with a single keypress. The Jet simulator even includes a special view-magnification feature that lets you zoom-in to identify objects or details at a distance.

Jet will run on any Commodore 64 or Commodore 128 computer with one disk drive and either color or monochrome monitor.

See Your Dealer ...
or write or call for more information. For direct orders please enclose $39.95 plus $2.00 for shipping and specify UPS or first class mail delivery. Visa, MasterCard, American Express, and Diners Club cards accepted.

SCENERY DISKS FOR JET AND FLIGHT SIMULATOR II ARE NOW AVAILABLE.

Commodore 64 and Commodore 128 are trademarks of Commodore Electronics, Ltd.

subLOGIC Corporation
713 Edgebrook Drive
Champaign IL 61820
(217) 359-8482 Telex: 206995

Order Line: (800) 637-4983
(except in Illinois, Alaska, and Hawaii)

Five characters is an arbitrary limit, but it yields a good speed-versus-performance ratio. You can drop the limit to as few as two characters and check nearly every word in the document, but then it could take hours to check a long file. Unless you're a world-class misspeller, you'll always spell words like *a*, *an*, and *the* correctly; for most people, it's words like *triumvirate* that cause problems.

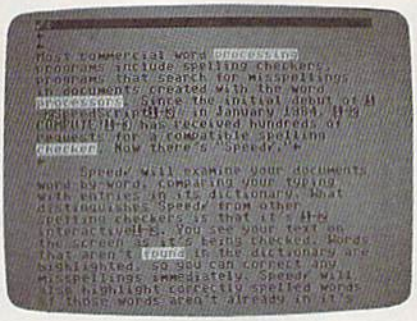
When counting characters in words, SpeedCheck recognizes only the letters A–Z and the apostrophe ('). Thus, contractions like *can't* are counted as five-letter words. The hyphen is not recognized, so a word like *left-handed* would be counted as two words, one of four letters and one of six. A letter's case (capital or lowercase) is not significant; all letters are converted to lowercase when looked up or added to the dictionary. Thus, a single dictionary entry would match *basic*, *BASIC*, and *Basic*.

Words in the SpeedCheck dictionary disk are kept in sequential files, with one file for each of the 26 possible initial letters. When new words are added, they are tacked onto the end of the files. This makes adding words fast and simple, but it makes looking up words slower because the words are in random—rather than alphabetical—order. Within the file for Z, for example, *zebra* might be found between *zymurgy* and *zipper*. The only way to find a particular item in randomly ordered data is to search sequentially from the first item until the desired item is found. Thus, when SpeedCheck looks up a word, it must hunt through all the words with the same initial letter before it can determine that the word is not present.

Nevertheless, SpeedCheck is faster than you might expect. The text for this article was checked in about 30 minutes using a dictionary disk containing about 2,000 words, including most of the words in the article.

Preparing The Program

Program 1 is a short BASIC program designed to manage the dictionary disk. Program 2 is SpeedCheck itself. Start by typing in and saving a copy of Program 1. This program allows you to create



Words not found in the SpeedCheck dictionary are highlighted so you can correct any misspellings immediately, or add them to your dictionary.

dictionary disks and to review and edit entries in the dictionary. If you've decided to use a value other than five for the minimum number of characters for checking, you'll need to change the value of LN in line 110. The values you set here and in Program 2 should agree (see Customizing SpeedCheck below for details).

Your next step is to create a blank dictionary disk. Run Program 1 and select menu option 5. You're prompted for an ID for the disk. Enter any two characters, but be sure that each dictionary disk has a unique ID. Don't change the disk name in line 220; SpeedCheck tests to see that the dictionary disk has this name, and won't let you proceed otherwise.

It's a good idea to occasionally make backup copies of your dictionary disk. Because it takes hours to build up a large dictionary, and because the dictionary disk is subjected to an above-average amount of reading and writing, you need to protect yourself against potential data loss. Any backup program can be used—for example, "ReDisk" (August GAZETTE). Just be sure to give all backup disks the name DICTIONARY DISK.

After you've created a blank dictionary disk, it would be worthwhile to spend a few minutes entering a basic list of commonly used words. Use option 2 of Program 1. Any words that frequently give you problems should be entered at this time. You'll need to have a real dictionary (the book kind) handy to insure that the words you enter are spelled correctly. You can use options 1 or 4 of Program 1 to review your dictionary, and make any necessary corrections with option 3.

Now you're ready to use SpeedCheck. Since it's written entirely in machine language, the listing for SpeedCheck is in MLX format. Be sure you read and understand the instructions for using the MLX program, found elsewhere in this issue, before proceeding. Load and run MLX, and answer the prompts as follows:

Starting Address: 49152
Ending Address: 51821

Now enter Program 2 and save it on disk.

MLX puts the SpeedCheck data at 49152 for convenience; this avoids the nuisance of having to reconfigure memory. However, like *SpeedScript*, the finished SpeedCheck program can be loaded, run, and saved as if it were a BASIC program. (*Do not* add a ,1 after the ,8 in the LOAD statement when loading the finished SpeedCheck.) If you try to list the program, you'll see a single line of BASIC. To begin, simply load SpeedCheck (Program 2) and type RUN. If you're a *SpeedScript* user, the initial screen should be familiar. You'll see a blank screen with a blinking cursor and a reverse video command line at the top.

At this point, you'll have either one or two options. If the cursor is blinking in the same color as the command line, you must load text to begin, so press f7 to access the Load feature. No other key is active. If you had *SpeedScript 3.0* text in memory when you loaded SpeedCheck—or if you previously exited SpeedCheck with text in memory—then the cursor will be in the bright highlight color. In this case, you can either press RETURN to check the text already in memory, or you can press f7 to load new text.

If any errors occur during the load, an error message will be displayed on the command line. To erase the error message and try another Load, press any key. (In general, whenever SpeedCheck displays any message in the command line, it waits for a keypress before proceeding.) After the text is loaded, or after you press RETURN if there's already text in memory, you're prompted to remove your text disk and insert the dictionary disk.

After inserting the dictionary

TYMAC PRINTER INTERFACES GIVE YOU MORE FOR YOUR MONEY...

And That's What It's All About

"The Connection"™
A Fully Intelligent Parallel Printer Interface for Commodore® Computers

Now, TYMAC provides a parallel printer interface designed exclusively for Commodore Computers, including Commodore 64™, Commodore 128™, Plus/4™, Commodore 16™ and VIC 20®. TYMAC's "The Connection" gives you complete control over your printing capabilities and offers you top-notch quality, unequalled by other interfaces of its kind. "The Connection" is compatible with virtually all Commodore software.

"The Connection" makes your investment in a printer interface worthwhile. "The Connection" simply plugs into the serial disk port to ultimately produce refined, finished documents. TYMAC has applied leading computer technology to equip "The Connection" with two modes: an emulation mode (imitates Commodore 1525 printers) and a transparent mode (information goes straight through—no interpretation). For a suggested retail price of only $69.95 (non-Epson) or $73.95 (Epson), TYMAC gives you the best printer interface available for your money.

With "The Connection," you can execute standard print commands (OPEN, PRINT#, and CLOSE) and create finished documents and graphics to your own specifications. Various options include column tabbing, dot tabbing, graphic repeat, dot addressable graphics, and more. Full printer self-test, LED status indicator, printer reset switch, skip over perf, margin set, and programmable line length give you maximum flexibility for optimum performance. "The Connection" also features a 2K buffer. "The Connection" is compatible with any parallel printer that is equipped with a standard Centronics interface, including Star, Riteman, Smith-Corona/Epson, Panasonic, BMC-80, Mannesman Tally, Olympia/Okidata, Canon/C. Itoh, NEC/Seikosha, Gorilla Banana/and Universal.

TYMAC backs "The Connection" with an outstanding reputation in the computer field since 1973. TYMAC tests every product 100% before it leaves the factory to guarantee flawless performance and the best value for your money. Each "Connection" comes with a full, one-year warranty. For information and literature about "The Connection," write or call TYMAC today. Or contact your local computer retailer to purchase "The Connection."

TYMAC®

Established in 1973

TYMAC CONTROLS CORPORATION
127 Main Street Franklin, NJ 07416 201-827-4050

Tymac is a registered trademark of Tymac Controls Corporation. Commodore, Commodore 64, Commodore 128, Plus/4, Commodore 16, and VIC 20 are registered tradmarks of Commodore Electronics Limited.

disk, press RETURN and SpeedCheck will begin to fill the screen with text. You'll probably see a number of highlighted words—words in reverse video and a different color from the text (not to be confused with *SpeedScript* formatting commands and printkeys, which also appear in reverse video, but in the same color as the text). These are the words that SpeedCheck did not find in its dictionary, so they may be misspelled. It's also possible that they are correctly spelled, but not yet in your dictionary.

Moving Around The Text Area

After the screen is filled, a cursor appears in the upper-left corner of the text, just below the command line. This is the home position for SpeedCheck. At this point, several more keys become active:

• RETURN: copies the word the cursor is on into the command line for editing or addition to the dictionary. (We'll call this "grabbing" the word; it will be discussed in more detail later.)

• Cursor left/right: behaves like the f1 and f2 keys in *SpeedScript*, moving the cursor left or right by whole words. When you're checking text, you can't move by a single character. The cursor should always stop on the first character of a word. It can be moved right one word at a time to the end of the document, with new lines scrolled in at the bottom as necessary. However, it can be moved left only as far as the home position of the current screen. You can't scroll backward in SpeedCheck, only forward.

• Cursor down/up: moves the cursor either down to the next line or up to the previous line. When moving up or down, the cursor shifts left or right to land on the first character of a word. The cursor can be moved down to the end of the document, with new lines scrolled in as necessary. However, it can be moved upward only as far as the home position of the current screen.

• CLR/HOME: moves the cursor to the home position. If the cursor is already home, pressing this key returns to the start of your document and rechecks the first screen of text.

• SHIFT–CLR/HOME: exits SpeedCheck. You'll be asked to verify this choice. Pressing Y exits to BASIC; any other key returns you to text. After exiting, you can type RUN again and reenter SpeedCheck without losing your text. The text will also be retained if you load and run *SpeedScript 3.0*.

• ↑ (up arrow): displays the next full screen of text. It's a bit faster than using cursor right or cursor down to scroll in one line at a time.

• SHIFT-↑: adds all highlighted words on the current screen to the dictionary before displaying the next full screen of text. This saves time when many words must be added to the dictionary, as when you're starting out with a new dictionary disk. You should be sure that all highlighted words on the screen are spelled correctly before using this feature. SHIFT-↑ has the same effect as ↑ if no highlighted words are on the screen.

• f1: searches forward in text for the next occurrence of a highlighted word and grabs the word into the command line. New screen lines are scrolled in if needed. The search can be cancelled by holding down the RETURN key until the cursor reappears. The search stops at the end of text if no highlighted word is found.

• f2 (SHIFT-f1): searches backwards in text for the last occurrence of a highlighted word and grabs the word into the command line. The search stops at the home position of the current screen if no highlighted word is found.

• f7: loads a new document from disk. Pressing RETURN alone at the filename prompt cancels the Load and returns you to text. SpeedCheck has no merge feature; a Load will overlay any text currently in memory. Load automatically appends the drive designation prefix 0:, so you should *not* include this when entering your filename. The check character (√) in the command line will disappear to indicate disk access. After the load is complete, you'll be prompted to insert the dictionary disk and press RETURN, after which the first screen of the new file will be checked. The cursor will return at the home position.

• f8 (SHIFT-f7): saves the text currently in memory to disk. Before the Save, you are prompted to remove the dictionary disk and press RETURN. Pressing any other key cancels the Save and returns you to text. (As with Load, Save can also be cancelled by pressing RETURN alone at the filename prompt.) The check character in the command line will disappear during the save to indicate disk access. After the Save, the cursor will be returned to its previous position in text. Save automatically appends the drive designation prefix 0: to the filename you enter, so you should *not* include this in the filename. This also precludes the use of the @ prefix for Save-with-Replace.

Command Line Editing

As mentioned earlier, SpeedCheck is not a word processor. You can move the cursor to a word in text, but you cannot directly edit it. To modify the word under the cursor, you must grab it into the command line by pressing RETURN (or searching with f1 or f2). Once the word and the cursor have moved to the command line, the following keys are active:

• All alphabetic, numeric, and punctuation keys.

• Cursor right/left: moves the cursor one character to the right or left, but not beyond the leftmost character of the word or more than one space beyond the rightmost.

• INST/DEL: allows you to insert spaces or delete characters within the word. When inserting, the total length of the word in the command line cannot exceed 32 characters.

• f3: adds the current contents of the command line to the dictionary. The word in the command line must be at least as long as the specified minimum word length or an error message will result. The word "added" will appear on the command line to let you know that the addition was successful. No check is made to determine if the word already exists in the dictionary before it is added. It doesn't hurt anything to have a word in the dictionary more than once; it just takes up extra space. However, it is important that you insure that

NEW
TOLL-FREE PHONE
1-800-541-1541

THE SHADOW KNOWS

Shadow is a new and revolutionary way to back up your most protected software. It encompasses all the latest advances in software, as well as a highly sophisticated piece of hardware. This is absolutely **the best** utility available today. You may not even need updates, but if you do, the Shadow's unique design allows for updates to be available for a nominal fee.

HACKER PACKAGE INTRODUCTORY OFFER **$39.95**

Shadow a disk while it loads, then read an exact list of:

- Track, sector, ID, check sum, drive status
- High and low track limits
- Density use on each track
- Half tracks that are used
- Command recorder shows exact commands that were sent to the 1541 while program was loading
- RAM recorder records custom DOS

Shadow-scan any disk, then read exact list of:

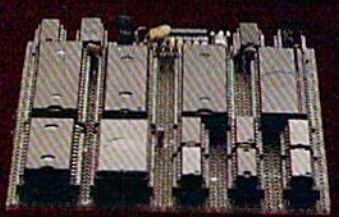
- Valid tracks, half tracks, partial tracks and segments
- Sync mark links, header block links, and data block links
- Track to track synchronization

Exclusive snap shot recorder will give you an exact copy of the 1541 RAM and can be viewed, saved or printed. Plus many more features included.

GT PACKAGE INTRODUCTORY OFFER **$39.95**

Highly sophisticated and integrated piece of hardware that turns your 1541 into something you've always wanted.

- Track and sector display
- Drive reset switch
- Device number change
- Half track indicator
- Abnormal bit density indicator
- Shadow on-off indicator



The Shadow display will give you an accurate display of precisely what track you are accessing during a normal load even if the program does a read past track 35.

Order by phone 24 hrs./7 days or send cashier's check/money order payable to Megasoft. Visa, MasterCard include card # and exp. date. Add $3.50 shipping/handling for continental U.S., $5.50 for UPS air. CODs add $7.50, Canada add $10.00. Other foreign orders add $15.00 and remit certified U.S. funds only. Distributors invited and supported.

MegaSoft LTD

P.O. Box 1080 Battle Ground, Washington 98604 1-800-541-1541

words added to the dictionary are spelled correctly. You defeat the purpose of the program if you add misspelled words. You can use the editing feature (option 3) of Program 1 to remove duplicated words or correct misspelled words.

• f4 (SHIFT-f3): searches the dictionary for the current contents of the command line. The check character (√) in the command disappears when you press f4. If the word is found, the check mark reappears in normal command line color. However, if the word is not found the check comes back in the bright highlight color (it reverts to normal as soon as a key is pressed). This feature is especially useful after editing. For example, suppose the word *paralell* appeared highlighted in your text, so you grabbed it into the command line and corrected it to read *parallel*. You could then use f4 to determine whether *parallel* is already in the dictionary or needs to be added.

• f5: incorporates the current contents of the command line into text in place of the grabbed word. Any highlighting of the original word is removed. If the word hasn't been edited, no obvious change takes place other than the removal of highlighting. If the word returned is shorter, then all characters to the right on that screen line are pulled in to cover the extra space. If you lengthened the word, there will be a slight delay as the screen is reformatted to accommodate the extra characters. (The RETURN key also has the same effect as f5.)

• f6 (SHIFT-f5): clears the command line and returns the cursor to the text area without incorporating any changes and without removing any highlighting that may be present. It has the effect of "ungrabbing" the word.

You might start a typical SpeedCheck session by loading text, inserting the dictionary disk, and pressing RETURN. When the cursor appears, you press f1 to move to the first highlighted word. You find it spelled correctly, so you press f3 to add it to the dictionary, then f5 to return to text, then f1 to find the next highlighted word. You notice that this word is misspelled, so you correct it, press f4 and discover that the corrected version is already in the dictionary, then press f5 to incorporate the correction into the text.

Then you notice a place where you used *their* when you meant *there*. SpeedCheck didn't catch the mistake, since both words are in its dictionary, but you can correct it simply enough. Use the cursor keys to move the cursor to the word, press RETURN to grab it into the buffer, change the spelling, then press RETURN again to incorporate the change. As you become comfortable with SpeedCheck's commands, you'll find that you can move quickly and smoothly from key to key as your document is checked.

Customizing SpeedCheck

It's easy to change the value for the minimum number of characters a word must have to be added or looked up. Just load SpeedCheck and POKE the desired value into location 2083. PRINT PEEK(2083) will show that the current value is 5. To change it, say, to a value of 4, type POKE 2083,4. If you save a copy of SpeedCheck after changing the value in 2083, your new value will be incorporated into SpeedCheck. Do not drop the limit below two characters.

You can use one minimum length value for a while and then change to another without having to create a new dictionary disk. But consider that if you use a four-character limit extensively and then switch to a five-character limit, you'll have many four-character words in the dictionary that the new version will never use. Likewise, if you use a five-character limit extensively, then switch to a four-character limit, searching will be slowed because all four-character words will start far into the dictionary.

If you'd prefer other colors for text, background, or highlighting, they're easily changed. The following locations hold color values:

2079	**Background color**
2080	**Text color**
2081	**Highlight color**

Simply POKE the appropriate location with the standard Commodore code (0–15) for the desired color. The only restriction is that the color you choose for highlighting (location 2081) must be different from the text color (2080). If you're not satisfied with your new choices, exit SpeedCheck and try again. If you save a new copy of SpeedCheck, your color changes will be incorporated.

SpeedScript doesn't waste any text memory. The spaces you see at the ends of lines and following return marks are not stored in memory. This is not the case with all word processors. Some, including *WordPro* and *PaperClip*, include within text all the spaces shown at the ends of lines. To use SpeedCheck with these word processors, you must defeat SpeedCheck's handling of the *SpeedScript* return mark (←) character. To create a version for *WordPro* and similar processors, substitute the following line while entering Program 2 with MLX:

```
50796 :234,234,144,197,032,155,080
```

When you use this version, text will look a bit different from what you may be accustomed to—there will be many extra spaces and words are no longer split at the right screen margin. Nevertheless, SpeedCheck should perform normally, and you can use the same dictionary disks you use with the *SpeedScript* version.

One additional change is required to create a version for *PaperClip* files. Since that program stores text slightly differently from the other two word processors, you must modify the Load routine a bit. Substitute the following lines when entering Program 2 with MLX:

```
51240 :003,166,174,164,175,032,242
51324 :198,255,169,194,133,174,223
51330 :169,196,133,003,169,035,067
51336 :133,175,133,004,169,000,238
51342 :133,176,169,036,133,177,198
```

If you're using a 1541-compatible dual-drive unit (drive numbers 0 and 1) with your 64, it's simple to modify SpeedCheck to use both drives. Load SpeedCheck, but don't run it. Enter the following line in immediate mode:

```
POKE 4700,49:POKE 4707,49
```

Then save a copy of the modified program. This new version requires that the text disk be in drive 0 and the dictionary disk in drive 1. When using the Save command, you'll still get the prompt to remove the dictionary disk. Simply ignore this prompt and press RETURN.

See program listings on page 157.

ENHANCER 2000

Commodore® Compatible Floppy Disk Drive

One Year Warranty With Second Year Extended Warranty Available

"Where Speed and Quality Meet"

• SUPER HIGH SPEED • SLIM LINE CONSTRUCTION (LOW PROFILE) FULLY COMMODORE COMPATIBLE • DIRECT DRIVE (DC) MOTOR • AVG. MTBF RATE OF 10,000 HOURS • VENTED CASE • SOLID STATE POWER SUPPLY • DUAL SERIAL PORT (CHAINING OPTION) • 5¼" INDUSTRY STANDARD FORMAT

Manufactured Exclusively BY CHINON INDUSTRIES of Japan For "THE COMTEL GROUP"

Foreign And Domestic Inquiries Welcome

1651 East Edinger Suite 209 Santa Ana, CA 92705

Commodore® is a Registered Trademark of Commodore Bus. Machines.

Telephone: (714) 953-6165
Telex: 503727

List Pager

Robert A. Stoerrle

If you own a printer, you'll appreciate this short utility. It allows you to divide printouts into pages, insert headers, and print page numbers. For the Commodore 64 and VIC-20.

No matter how much you adjust the paper on a printer, it seems that one line always prints smack dab on the perforation. When you separate the pages, the line is cut in half. Some printers have a "skip-over-perf" or *paging* option, accessed by setting a DIP switch or sending an escape code. On the 1526 or MPS-802, for example, you turn paging on with PRINT#4, CHR$(147).

But this important feature is missing from the Commodore 1525, MPS-801, and MPS-803 printers. "List Pager" is a short machine language utility that offers a solution to the problem. It causes the printer to automatically skip to the top of the next page when it runs out of room on the current page. And it will print both a header at the top of each page and the page number, if you want. Even if your printer already skips over perforations, you'll find the header and page numbering options useful.

Special Loading Instructions

Type in and save the List Pager loader program, which uses a special technique to store the machine language (ML) program in a string variable. The ML has to be saved to tape or disk as an object file (a pure machine language program) before you can activate it.

After running the program, you're asked if you wish to save it to tape (T) or disk (D). If you press D, you're prompted for a filename. If you're saving it to the same disk as the loader program, be sure to use a different program name. After you give it a name, the machine language portion of the program is saved to disk. If you're using tape, be sure to have a blank tape in the Datassette, preferably positioned to the beginning. Press T and the computer will prompt you to press RECORD and PLAY (tape users don't name the program because the ML string becomes the name of the file).

To load the ML program from disk, type:

```
LOAD "filename",8,1: POKE56,PEEK(56)-
1:NEW
```

The first time you load it from tape, type this line:

```
OPEN 1:CLOSE 1:POKE 56,PEEK(56)-1:C
LR
```

In both cases, you should be loading the *object file* that was created, not the loader program you typed in. Besides loading the program, these procedures clear all variables.

Protecting The Cassette Buffer

The cassette buffer is a section of memory that acts as a sort of pipeline between the cassette drive and the computer. It's a safe place to store ML programs on the VIC-20 because memory expansion changes the layout of BASIC memory. You can't count on any part of the VIC's BASIC memory to be available for a machine language program, so the cassette buffer is often the best place for ML. This program works on both the 64 and VIC (unexpanded or expanded).

Solving the problem of VIC memory expansion creates a problem for tape users. If the List Pager ML is in the cassette buffer when a program is loaded, it will be overwritten because the data on tape is temporarily stored in the buffer. So, VIC and 64 tape users will have to take measures to protect the cassette buffer while using List Pager.

Tape users should *never* access tape files while List Pager is active. Before loading, saving, or opening, press RUN/STOP-RESTORE to turn off List Pager. After you load or save a program, List Pager will be gone, overwritten by the program data. To load it back in, put the cassette containing the ML part (the object code) of List Pager into the Datassette and enter **OPEN1: CLOSE1** (you should not enter the POKE to 56 unless this is the first time you're loading List Pager). The program is built into the tape file header and will load directly into the cassette buffer. You'll have to enter the SYS below to start it up.

The order of loading programs is just the opposite for disk owners. Tape users load the program to be listed first and then load List Pager (because of the cassette buffer). With a disk drive, you must load List Pager first (because of the NEW instruction after the LOAD and POKE). Once it's loaded, you can load the program or programs to be listed. Disk owners need to load the ML only once; disk access doesn't affect the cassette buffer.

Telling It What To Print

Once List Pager is loaded, following the instructions above, you must activate it and tell it what to do at the top of each page. The format for this command is:

```
SYS 833,"Header"
```

If you want a header at the top of each page, put it between quotes. If you want the page number to be printed, insert a number sign (#) into the header at the point where you want it to be printed. For example:

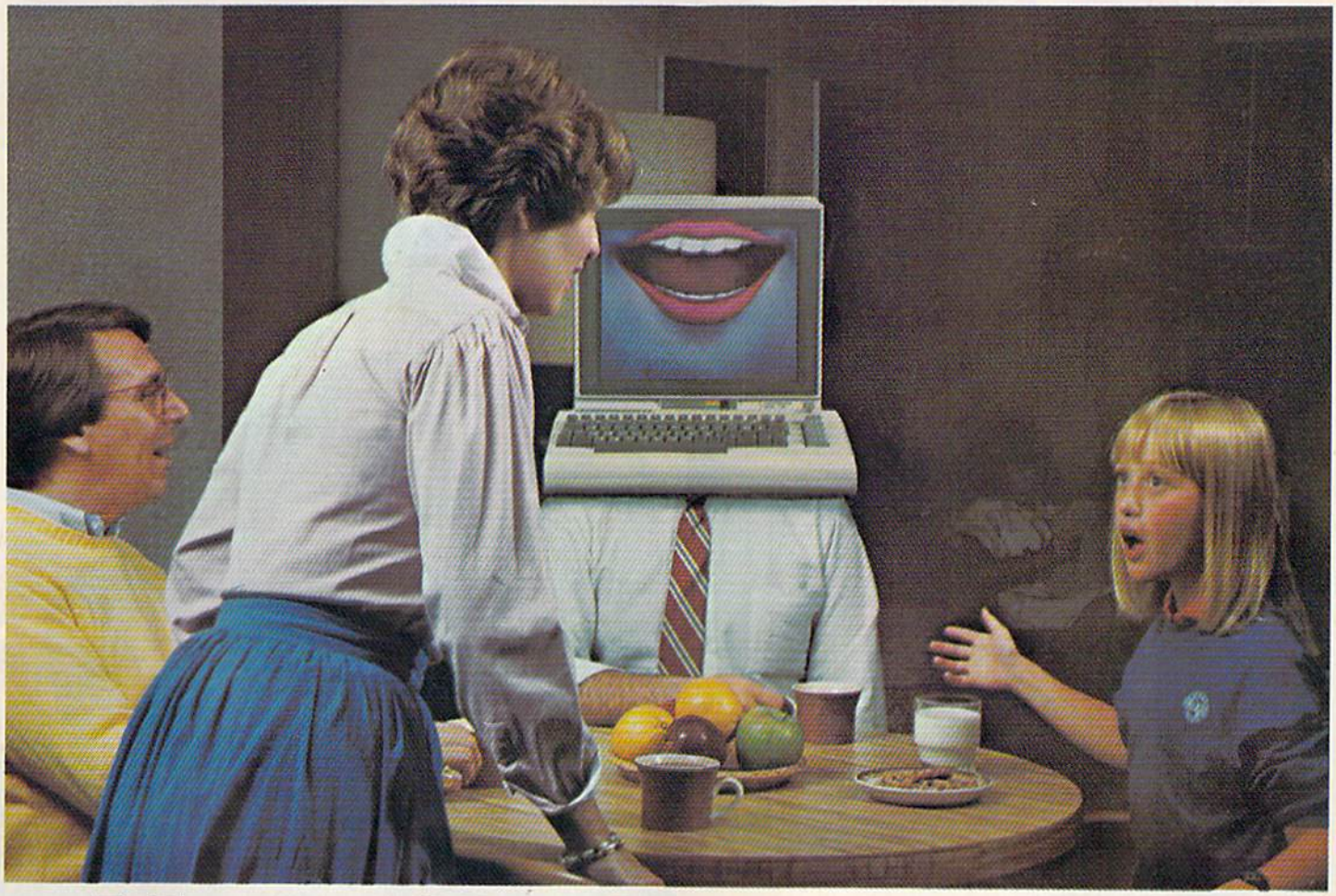
```
SYS 833,"LIST PAGER.....PAGE #"
```

The designated header will be printed at the top of each page. Pages will be numbered consecutively, starting at page one. If you do not want a header at the top of each page, do not put anything between the quotes:

```
SYS 833,""
```

You must *always* use a comma

CAN WE TALK?



You Bet We Can!

Announcing The VOICE MESSENGER and EASY SPEECH For The Commodore 64 and 128.

YOU'RE NOT ALONE--ANYMORE! (Or how to program your best friend)
Ever ask yourself why you spend so much time alone. Or, if only someone would talk to me. Thanks to Welwyn/Currah, you won't have to think about those things again with the new, exciting VOICE MESSENGER™ speech synthesizer and accompanying EASY SPEECH™ text-to-speech system.

TALK TO ME
By simply plugging in the VOICE MESSENGER to your Commodore 64™ and 128™ home computer, it can really become your best friend. The VOICE MESSENGER and EASY SPEECH system will say anything you want, letter by letter, in words, sentences, or in conversational or story form.

SOUNDS GOOD
Unlike other types of synthesizers the VOICE MESSENGER and EASY SPEECH system has an allophone speech synthesizer that makes computer speech intelligible with an unlimited vocabulary that will speak to you clearly and understandably. Its text-to-speech converts your typed copy into conversational dialog at the touch of the keyboard.

NOT JUST ALL TALK
Welwyn/Currah along with Rist, Inc. are without a doubt the most innovative developers of computer speech technology. The VOICE MESSENGER and EASY SPEECH system was designed for all possible applications: educational, entertainment, business and home utility. And can immediately be put into use with most dedicated, menu-driven and pre-existing software including: Infocom's™ "Adventure Series", the CBS™ "Success with Math" educational series, and many, many more.

TALK IS CHEAP! (Inexpensive, anyway)
The VOICE MESSENGER and EASY SPEECH system is available at a suggested combination retail price of under $70.00, or may be purchased separately.

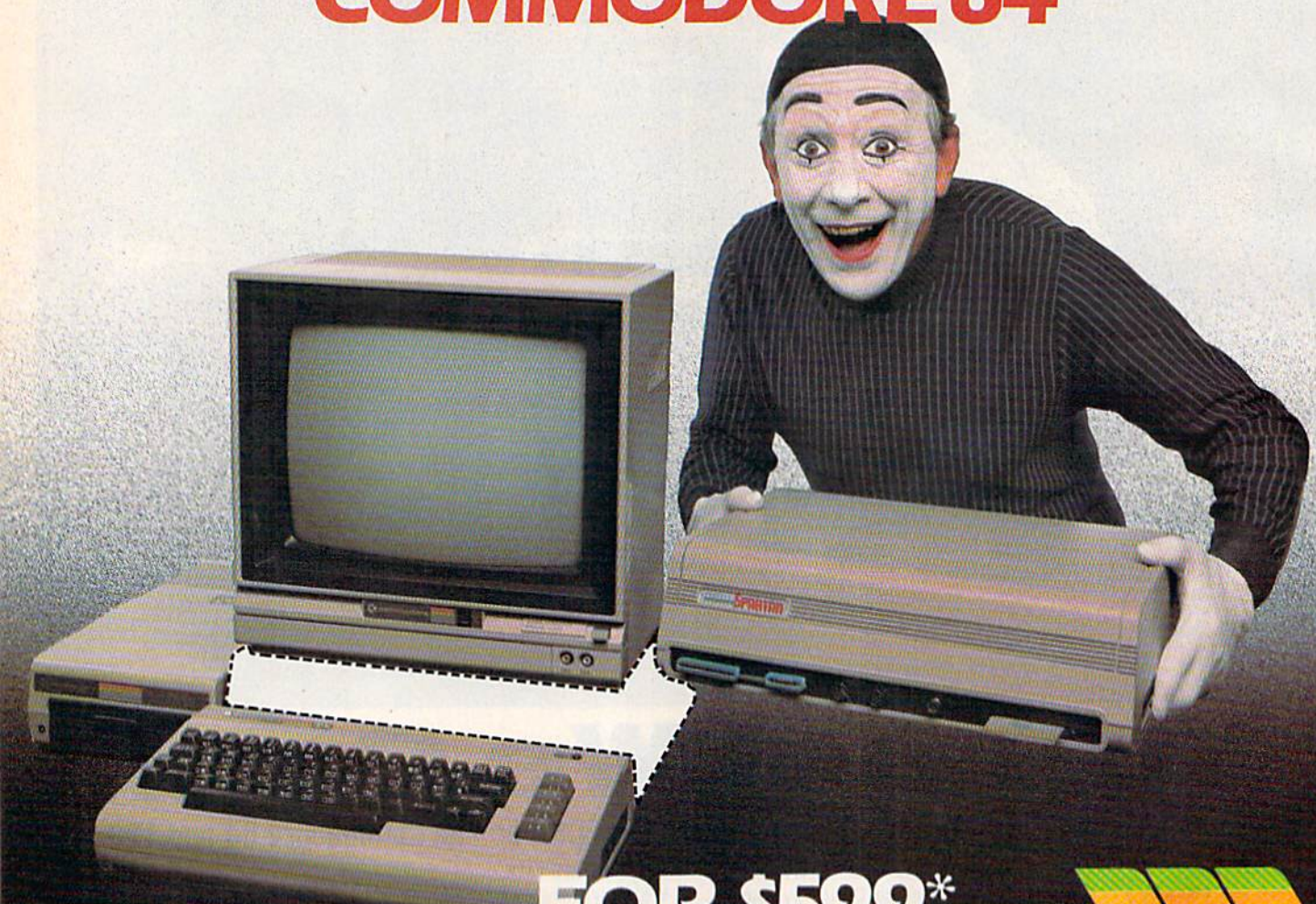
To find out how you can turn your Commodore 64 or 128 computer into your best friend, or to locate a store location nearest you call: (313) 547-8300; or write: Welwyn/Currah, 104 West Fourth Street, Suite 208-9, Royal Oak, Michigan 48067.

Welwyn CURRAH

Commodore 64 & 128 are trademarks of Commodore, Inc. Infocom is a trademark of Infocom, Inc.
Voice Messenger & Easy Speech are trademarks of Welwyn/Currah & Rist, Inc. CBS is a trademark of CBS Software

© 1985 Welwyn/Currah. All Rights Reserved.

HOW TO GET OVER $2000 WORTH OF NEW CAPABILITIES FOR YOUR COMMODORE 64™



FOR $599*

The Spartan™ is the Apple™ II+ emulator for your Commodore 64™ that will open up a whole new world of hardware and software for you! Imagine adding these features to your Commodore 64™ for the Spartan™ price of $599: ☐ Apple™ II+ hardware and software capabilities ☐ 64K RAM expansion ☐ four software selectable Commodore 64™ cartridge slots ☐ non-dedicated 8-bit parallel port ☐ standard audio cassette deck capabilities for your C-64™. The suggested retail value of comparable products offering only these capabilities is over $2200.00* — but the Spartan™ gives you much, much more! By building on your investment in your Commodore 64™— an excellent introductory computer — you create a whole new system with both C-64™ and Apple™ II+ capabilities. There is a whole other world out there! The huge selection of Apple™ II+ hardware and software is now yours to explore! Call toll free for the Spartan™ dealer nearest you.

*All prices quoted are in U.S. funds, freight and taxes not included. Value of components equivalent to the Spartan™ system are quoted from Apple™ II+ CPU and Apple™ II+ single disk drive 1983 list prices, and from current suggested list prices and component specifications of other peripheral manufacturers. Commodore 64™ and Commodore logo are trademarks of Commodore Electronics Ltd. and/or Commodore Business Machines, Inc. Apple™ II+ is a trademark of Apple Computer Inc. Spartan™ is a trademark of Mimic Systems Inc. and has no association with Commodore Electronics or Apple Computer Inc. The Spartan™ is manufactured by Mimic Systems Inc. under license granted by ATG Electronics Inc. of Victoria, B.C. Canada.

MIMIC

FOR INFORMATION WRITE:
MIMIC SYSTEMS INC.
1112 FORT ST., FL. 6J
VICTORIA, B.C.
CANADA V8V 4V2

TO ORDER CALL:
1-800-MODULAR
(663-8527)

and quotes, even if you do not wish to print a header.

After entering the header line, position the paper so that the print head will start printing a few lines down to allow for a top margin. If you've not already done so, load the program you wish to list (remember, tape users should load the program to be listed before loading List Pager). Type the following line:

```
OPEN 1,4:CMD 1:LIST
```

The printer should print the header, if you specified one, and start to list the program. When it's finished, type:

```
PRINT #1:CLOSE 1
```

List Pager will remain in effect until you press RUN/STOP–RESTORE. That is, it will continue to separate pages and print the header at the top of each page.

Options

The program is written for standard 8½ × 11 inch paper, with six lines per inch, a total of 66 lines on each page. If you're using nonstandard paper, you can modify the parameters. Some European countries, for example, use slightly longer paper. The program defaults to 54 printed lines on a page of 66 lines. This leaves two lines for the header (one printed, one blank) and ten lines between pages (five at the top, five at the bottom).

After the program has been loaded, you can change the number of printed lines per page with a POKE:

```
POKE 926,x+4
```

where x is the desired number of printed lines per page. For example, if you wish to print 38 lines per page, you would type **POKE 926, 38+4** after the program is loaded (but before you enter the SYS). The default number of printed lines per page is 54.

To change the total number of lines per page (printed and unprinted):

```
POKE 934,x
```

where x is the number of lines per page. The default number is 66.

Not Just For Program Listings

List Pager is designed to work with every printer, whether dot-matrix or letter-quality. However, it will work only with a printer with a device number of four. Also, it will not affect listings on the screen. It can be used for a variety of purposes, not just program listings. For example, you can use it within BASIC programs to divide output into pages.

List Pager works by inserting a "wedge" into the routine that the computer uses to print a character. Every time the computer wants to print a character, it goes to the wedge program first. If the character is a carriage return, and the computer is at the bottom margin of a page, it skips to the next page and prints the header. If the character is not a carriage return, it's sent to the normal print routine.

To make List Pager work on both the 64 and VIC (expanded or not), the cassette buffer was used to hold the program. Because of this, some conflicts may arise. Using the cassette drive while this routine is in effect will usually cause the system to lock up. In addition, other programs which reside in the cassette buffer, such as "The Automatic Proofreader," cannot be used at the same time as List Pager.

See program listing on page 144.

IF THERE'S SOMETHING STRANGE PREVENTING DISK COPYING

call

DISKBUSTERS™

DISKBUSTIN' IS GONNA MAKE YOU FEEL GOOD! Now you can make back-up copies of your newest software. This is the SUPER-FAST Disk Copier that ZAPS thru copy protection! Average copy time is only 3-4 minutes. Includes unique Power-Pack feature for tough disks. Has copy capability not available until now, and even copies other copiers!! DISKBUSTERS will help you insure the safety of your software investment, and it's both C-64 and C-128 compatible!

WE AIN'T AFRAID OF NO DISKS!!

INTRODUCTORY OFFER ONLY $29.95

To order by phone call (805) 569-1644 Operator 10

Order by phone, VISA/MASTERCARD/COD or send Check or Money Order and include shipping charges. CA addresses add 6% tax: $3.50 ship USA addresses; UPS air $5.50, COD add $4.00 to continental US only; Canada $7.50; all other countries $10.00 and must include U.S. certified money order only.

dob SOFTWARE Box 31169 • Goleta • CA • 93130

Variable Saver

G. Russ Davies

Here's a technique for automatically saving variables with your program. The next time you load the program, a few POKEs bring all the variables back. Also included as an example is a short household budgeting program. For the VIC and 64.

Two methods are commonly used for handling large amounts of data in BASIC programs. The first method, using DATA statements, reads information into a program. But changing the DATA statements means listing the program and typing new data. It's not the best way to handle information that changes often. Data files, the second method, are the next step up. First you open a file on tape or disk and then print the information out. To retrieve it, open the file and read the information back in. But it takes time to read and write files.

If you've ever wanted to load a program and have the variables instantly ready, here's a technique you can use. After a few PEEKs and POKEs, you have immediate access to variables.

An Easy Filing System

Saving variables with a program provides an easy data filing system since the data is located with the program, not on another tape or disk. For the nonprogrammer, this integration of the program and variable data can substantially simplify program operation. Since program-calculated variables are reloaded, results of the previous run can easily change the way the current run is to be performed without adding more complicated file input/output processing or "dynamic keyboard" techniques.

Also, the fact that variables are saved with a program can be used to provide a store/restore facility—allowing you to interrupt your work, save the state of the program and variables, then later restore the saved version and continue on with your work. The technique is not meant to replace DATA statements, "dynamic keyboard," or input/output files, but is an alternative tool you'll find useful in certain situations.

Where Variables Reside

Variables are stored at the end of the BASIC program in the Commodore 64 and VIC-20. These variables are separated by type (scalar, array, and strings) with pointers used to mark the beginning and ending locations of each type of variable "pool." Pointers also keep track of the beginning and ending locations of the BASIC program.

The pointers which mark the locations of the BASIC program and variable pools are kept in one area of memory—from locations 43 to 56:

43–44	beginning of the BASIC program
45–46	end of the program, beginning of the scalar variables
47–48	end of scalar variables, beginning of the array variables
49–50	end of the array variables, beginning of free RAM (with room for more variables as they are created)
51–52	end of free memory, bottom of string variables
55–56	end of the string variables

If a 64 BASIC program is 4000 bytes long, it would start at 2049 and end at 6049. The pointers at 43–44 and 45–46 would contain these two numbers. If nonarray variables took up another 2000 bytes, locations 47–48 would point to 8049, and so on. When you type SAVE, the computer uses the pointers to the BASIC program to figure out where the program is. Variables are not saved.

But, we can fool the computer into thinking the program is longer than it really is by changing the values in locations 45 and 46. If the pointer to the end of the program is changed to reflect the end of the variables, the variables will be saved along with the program.

We must also save the pointers that are used to mark the beginning and end of each type of variable pool, or the variables will be unusable. Since the free area of unused memory is located between these variable pools, the amount of time and space required to save the program variables can be reduced by limiting the free area to only the amount needed by the program.

Because the saved variable pool pointers may be incorrect if

Earth will be destroyed in 12 minutes to make way for a hyperspace bypass.

Should you hitchhike into the next galaxy? Or stay and drink beer?

Slip the disk in your computer and suddenly you are Arthur Dent, the dubious hero of THE HITCHHIKER'S GUIDE TO THE GALAXY, a side-splitting masterwork of interactive fiction by novelist Douglas Adams and Infocom's Steve Meretzky. And every decision you make will shape the story's outcome. Suppose for instance you decide to linger in the pub. You simply type, in plain English:

>DRINK THE BEER

And the story responds:

YOU GET DRUNK AND HAVE A TERRIFIC TIME FOR TWELVE MINUTES, ARE THE LIFE AND SOUL OF THE PUB, THEY ALL CLAP YOU ON THE BACK AND TELL YOU WHAT A GREAT CHAP YOU ARE AND THEN THE EARTH GETS UNEXPECTEDLY DEMOLISHED. YOU WAKE UP WITH A HANGOVER WHICH LASTS FOR ALL ETERNITY. YOU HAVE DIED.

Suppose, on the other hand, you decide to:

>EXIT THE VILLAGE PUB THEN GO NORTH

In that case you'll be off on the most mind-bogglingly hilarious adventure any earthling ever had.

You communicate – and the story responds – in full sentences. So at every turn, you have literally thousands of alternatives. If you decide it might be wise, for instance, to wrap a towel around your head, just say so:

>WRAP THE TOWEL AROUND MY HEAD

And the story responds:

THE RAVENOUS BUGBLATTER BEAST OF TRAAL IS COMPLETELY BEWILDERED. IT IS SO DIM IT THINKS IF YOU CAN'T SEE IT, IT CAN'T SEE YOU.

Simply staying alive from one zany situation to the next will require every proton of puzzle solving prowess your mere mortal mind can muster. So put down that beer and hitchhike down to your local software store today. Before they put that bypass in.

Comes complete with Peril Sensitive Sunglasses, a Microscopic Space Fleet, a DON'T PANIC Button, a package of Multipurpose Fluff and orders for the destruction of your home and planet.

Other interactive science fiction stories from Infocom.

INFOCOM™

For more information call 1-800-262-6868. Or write to us at 125 CambridgePark Drive, Cambridge, MA 02140.

© 1985 Infocom, Inc. THE HITCHHIKER'S GUIDE TO THE GALAXY is a trademark of Douglas Adams. PLANETFALL, STARCROSS, SUSPENDED and A MIND FOREVER VOYAGING are trademarks of INFOCOM, Inc.

HardBall.™ The game that'll turn your Ferrari into a pinch hitter.

Baseball, so real and lifelike that you'll bench your Ferrari! That's HardBall, quite simply the most realistic sports simulation game of all time. In just five minutes you'll see that all other computer baseball games are minor league compared to HardBall. You'll swear you're watching the Saturday afternoon "Game of the Week" on network television!

Hardball plays as a field-action game or a manager-strategy game—or both. Watch curveballs actually drop over the plate, listen to the umpire yell "strike three" or consult the manager's screen for a key substitution. You can even position the infield and outfield to match the batter's style or game situation.

Accolade™

For dealer information contact: Accolade Inc., 20863 Stevens Creek Boulevard, Cupertino, CA 95014, (408) 446-5757. All rights reserved © 1985.

by eight π symbols (type SHIFT up-arrow to display the π symbol) in line 100 of the program reserves eight bytes in which to save the variable pool pointers. By using the first program statement for this purpose, the saved variable pointers can easily be located by adding seven to the contents of the pointer in 43–44.

Be sure to squeeze the eight π symbols up next to the quotation mark following the REM (don't put a space between them). The π symbol is used because its ASCII code of 255 is not a possible value in the second position of variable pool pointers, so we can instantly determine if pointers have been saved into line 100. Line 150 checks the second position of the first saved pointer and branches to the variable initialization routine if no pointers to variables have been saved by a previous run. When variable pointers are stored into line 100, listing that line may cause some strange characters to be displayed, but the rest of the program will list and run correctly.

To cause the program to *ignore* any previously saved variables, the program and variables are loaded into a different sized VIC-20, the same amount of memory expansion is required when loading programs as was used when saving. The 64 needn't be restricted.

The Home Budget Program

To illustrate this technique, I've included a simple budgeting program that keeps track of income and bills.

Since you can change the description of all categories and the amounts budgeted to the categories, this program is a natural candidate for the variable saving technique. The user may progressively modify and refine the budget. Monthly final versions may also be kept for household records. Each month's budget can then use a previous month as a beginning model.

The program works on the 64 and any expanded VIC-20. Notice the indicated changes for the VIC-20 that are included in REM statements. The item descriptions for the 64 may be extended to 27 characters by using the program prompts.

The REM statement followed

Psi 5 Trading Co.™ The game that'll put your BMW into orbit.

It's the 35th Century and you're trying to captain Quasan-3GP Space Freighters on the edge of an eternal galaxy. You don't have time to tool around in your BMW, you're trying to outlast marauding space pirates who seem to be reading your mind.

It's a long shot, but this is your only chance to save the starved-out inhabitants of the Parvin Frontier. You hand-pick your own crew from 30 possible candidates. Some will be human. Some will not. Make the right choice! Each candidate has his own special skills and personality. If you can't manage them, you won't survive.

Accolade™

For dealer information contact: Accolade Inc., 20863 Stevens Creek Boulevard, Cupertino, CA 95014, (408) 446-5757. All rights reserved © 1985.

The Dam Busters.™ The game that'll keep your Aston Martin in the hangar.

You won't be doing much cruising around in your Aston Martin when you have the game that lets you refly one of the R.A.F.'s most decisive World War II bombing missions. You must man seven different tactical positions within the bomber. Grasp control of the intricate and complex cockpit or you will perish. Don't kid yourself, this is a very difficult game. To be successful, you'll need the right stuff!

Your mission is to match the legendary raid led by Wing Commander Guy Gibson on May 16th, 1943. Against incredible odds, British Lancaster Bombers from his Squadron 617 successfully breached three dams, flooding the Ruhr Valley, and virtually crippling the Nazi war machine.

Accolade™

For dealer information contact: Accolade Inc., 20863 Stevens Creek Boulevard, Cupertino, CA 95014, (408) 446-5757. All rights reserved © 1985. Licensed from Sydney Development Corp., Canada © 1984.

load and run the program, press the STOP key, change line 100 to contain a π character in the second position after the REM", and then run the program again. You'll probably want to keep a copy of the program without saved variables for a master copy.

Lines 170–200 reestablish the saved variable pool pointers. Notice that variable names cannot be used until after the pointer in 45–46 has been restored by lines 170–180; then a loop can be used to restore the remaining three pointers.

Line 210 insures that only 1024 bytes of variable storage space are allocated. The minimum amount is determined by estimation with FRE. Reducing the variable storage space will significantly speed the saving and loading of saved variables since the vast empty free memory area isn't included. The variable pool size is similarly restricted in line 580 to initialize the variables the first time the program is run. Line 210 then causes first-time variable initialization to be skipped since saved variables are being used.

Note that we have reduced the amount of variable storage available to BASIC. Line 480 tells you (when finished with the program) to SYS to the power-up routine that will reset the BASIC pointers to the normal configuration.

If you decide to save the variables with the program, lines 510–560 will save the variable pointers into line 100 and change the end-of-program pointer to include the variable pools.

You can now save the program and current variables on tape or disk. The next time the saved program is used, the calculated and user-modified variables will be "remembered."

If you use this technique in your own programs, keep a few things in mind. You have to save the pointers before altering them; the most convenient place is in a REM statement at the beginning of the program. And when the program with the saved variables is loaded, you can't use any variables until you restore the pointers. Finally, the program must be resaved after you finish working with and changing variables.

See program listing on page 144.

Law of the West.™ The game that'll keep your Porsche off Main Street.

If you've ever wanted to strap on a six-shooter, pin a tin star to your chest and match the exploits of Bat Masterson or Wyatt Earp, then Law of the West is your chance. Forget about gunning down Main Street in your Porsche. It's the 1870's and you're the Sheriff of Gold Gulch—as bad a Wild West town as there ever was.

You won't survive by blasting your way out of every sticky situation—some of the gunslingers are just too fast. So, use your street smarts and get to know their "bad guy" personalities. You've also got to keep the locals happy—Rose, the saloon keeper, the doctor, the "kid" and even your own deputy—they're all valuable allies if you want to live to see another high noon.

Accolade™

For dealer information contact: Accolade Inc., 20863 Stevens Creek Boulevard, Cupertino, CA 95014, (408) 446-5757. All rights reserved © 1985.

If you've discovered a clever time-saving technique or a brief but effective programming shortcut, send it to "Hints & Tips," c/o COMPUTE's GAZETTE. *If we use it, we'll pay you $35.*

Load From The Disk Directory

M. Albani

One of the first things new owners of disk drives learn is how to load and list the directory (**LOAD"$",8** followed by **LIST**). On the 128 and Plus/4, you can use the built-in DIRECTORY command or the corresponding function key. The number of blocks used by each program appears on the left, then the filename in quotation marks, and the type of file. On the 128, 64, and VIC, holding down the CTRL key slows the listing. The Plus/4 and 16 use the Commodore key for a similar effect.

When you see the program you want, stop the listing by pressing the RUN/STOP key. If the file is named "QWERTY", you can type **LOAD "QWERTY",8** or **LOAD "QWERTY",8,1** if it's a machine language (ML) program.

But there are a couple of easier ways. While the directory is still on the screen, you can move the cursor to the line containing the program name. Type **LOAD** and cursor right to the space just past the second quotation mark. Add **,8:** and press RETURN. If you forget the colon, the computer thinks PRG is part of the LOAD command and returns an error message. Curiously, you don't need the colon if you're loading an ML program with **,8,1**.

This method of loading from the directory saves some typing, but there's an even better way—you build the ,8: or ,8,1 into the program name. When you save a BASIC program, use this format:

```
SAVE"PROGRAMNAME
{SHIFT-SPACE}{D}8@",8
```

When you load and list the directory, you'll find the SHIFT-SPACE (entered by holding down SHIFT and pressing the space bar) has turned into a quotation mark, the Commodore-D is a comma, the 8 remains an 8, and the SHIFT-@ is a colon. Now you can load the program very quickly: load and list the directory, cursor to the program you want, and enter either LOAD or L SHIFT-O, the abbreviation for LOAD. If you're using MLX or have another way to save ML programs (see below), you can use a similar syntax for ML files:

```
SAVE"PROGRAMNAME
{SHIFT-SPACE}{D}8{D}1",8
```

Remember that filenames must be 16 characters or less, including the graphics characters and shifted space. If you want to add the ,8: to an existing program, use the rename command: **OPEN 15,8,15, "R: newname=oldname"**, with the SHIFT-SPACE and graphics characters in the new name.

After you've created the **,8:** or **,8,1** suffix, you need to press just three keys to load a program from the menu: L, SHIFT-O, and RETURN.

A Library Of Subroutines On Tape Or Disk

Michael Dean

At one time or another, every programmer has wished for a way to append subroutines to a program. Many such routines, like the MERGE command from "Meta-BASIC," work only with a disk drive.

With a few PEEKs and POKEs, you can append one program to another on the 64, Plus/4, 16, and VIC using either a Datassette or a disk drive. This technique won't work on the 128 in 128 mode because variables are stored in a separate bank of memory. Also, the 128's memory locations are used in a different way.

First, load the main program. Then add these lines to the beginning:

```
1 PRINTPEEK(43),PEEK(44)
2 SV=PEEK(45)+256*PEEK(46)-2
3 POKE43,SVAND255:POKE44,SV/25
  6:NEW
```

Write down the two numbers you see on the screen; they're pointers to the start of BASIC. On a 64, you should see a one and an eight, unless you've moved the beginning of BASIC for some reason. Don't worry about the NEW command in line 3, it won't erase the main program from memory. Now load the second program, the subroutine to be added to the end of the main program.

Now, take the two numbers—the pointers that were printed to the screen—and POKE them back into 43 and 44. If they were one and eight, you would type **POKE 43,1 :POKE 44,8**. Listing the program should show that the second program has been appended to the first. You can run this routine several times to append several programs.

There's one important thing to note: The line numbers in the second program should be higher than the highest number in the first. This method of appending programs does not renumber the lines.

If you keep good records, you could build up a library of general-purpose subroutines, starting at a relatively high line number like 40000 (the highest possible line number is 63999). You might number a joystick reading routine 40000–40052, a hi-res graphics routine with lines 40100–40277, and so on. Keep notes on how each routine works and which variables are used.

Then, when you write a program, append the appropriate subroutine from the library. The programs in the library could be short and simple—a few lines that read the disk error channel—or

It's Absolutely Shocking!!!

After all these years, CMS Software Systems is still the only company providing professional quality accounting software for the complete line of Commodore business computers.

Whether you own an 8032, 8096, SuperPET, B-128, C-64, or the new C-128, we have a professionally written, fully integrated Accounting System designed especially for you.

Introduced in 1979, the **CMS Accounting System** was the first Accounting System available for Commodore computers. Not satisfied with just being first, we have continued to update, expand, and improve until today, the **CMS Accounting System** is widely recognized as one of the finest Accounting Systems available for any computer.

Now Available for the Commodore C-128

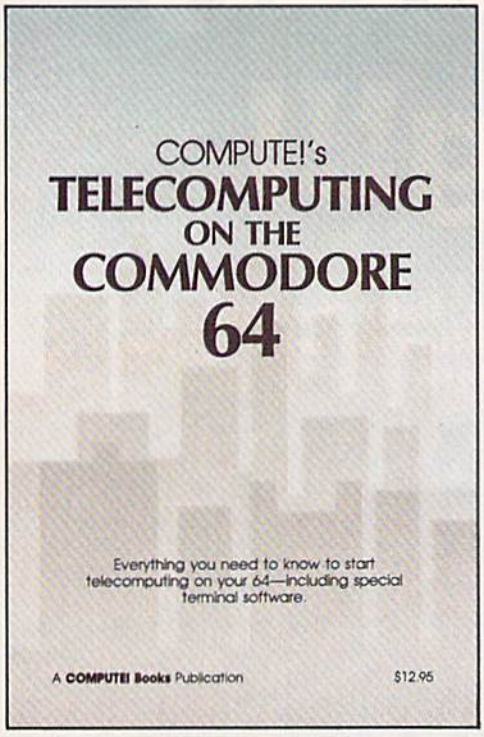
- General Ledger
- Accounts Receivable
- Billing
- Accounts Payable
- Job Costing
- Payroll

$179.95
Complete Price

For more information see your Commodore dealer or call Cathy York at 214/289-0677.

CMS Software Systems, Inc. • 2204 Camp David • Mesquite, TX 75149

Learn All About



with

COMPUTE!'s Telecomputing on the Commodore 64

This comprehensive guide explains everything you need to know to start telecomputing on your Commodore 64.

Many home computer analysts believe that telecomputing will soon be the most popular use for home computers. *COMPUTE!'s Telecomputing on the Commodore 64* introduces readers to telecommunications, with sections on buying and using modems, accessing information services and bulletin boards, and uploading and downloading files. Best of all, there are terminal programs which allow you to communicate with the information services and bulletin boards.

Edited
$12.95
0-87455-009-2

For your convenience, there's also a disk available which includes all the programs in the book. This 5¼-inch floppy disk saves you hours of typing and prevents many typing errors. It's fast, inexpensive, and ready to load on your Commodore 64. You can order the *Disk* directly from COMPUTE! Books for only $12.95.

To order *COMPUTE!'s Telecomputing on the Commodore 64* or the *Disk*, mail the order form with your payment to COMPUTE! Books, P.O. Box 5058, Greensboro, NC 27403. For fastest service, call toll free 800-334-0868 (in NC 919-275-9809.)

YES! I WANT TO LEARN TO TELECOMPUTE WITH MY COMMODORE 64.

Please send me:

____ ***COMPUTE!'s Telecomputing on the Commodore 64,*** (009-2) $12.95 ea. _____
(Add $2.00 per book U.S. and surface mail, $5.00 airmail, for shipping charges.)

____ ***COMPUTE!'s Telecomputing on the Commodore 64 Disk,*** $12.95 each _____
(Add $2.00 per disk for shipping charges.)

ALL ORDERS MUST BE PREPAID IN U.S. FUNDS

Subtotal _____
NC residents add 4.5% tax _____
Shipping charges _____
Total paid _____

☐ Payment enclosed (check or money order)
☐ Charge ☐ MasterCard ☐ Visa ☐ American Express

Account No. _____ Exp. Date _____
(Required)

Signature _____
Name _____
Address _____
City _____ State _____ Zip _____

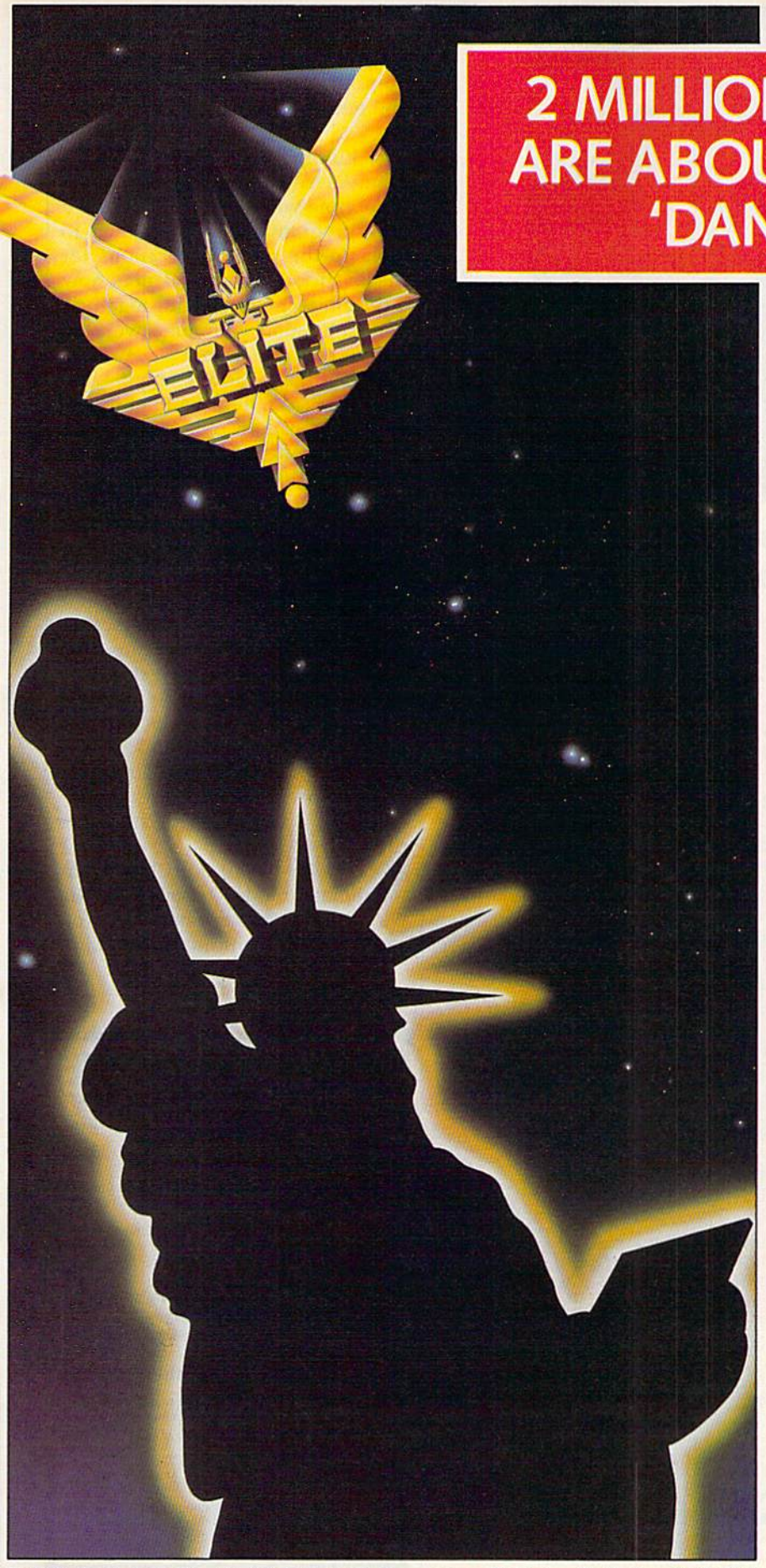
Please allow 4–6 weeks for delivery

75D0092

COMPUTE! Publications, Inc.
One of the ABC Publishing Companies

COMPUTE! Books are available in the U.K., Europe, the Middle East, and Africa from Holt Saunders, Ltd., 1 St. Anne's Road, Eastbourne, East Sussex BN21 3UN, England.

TELECOMPUTING



2 MILLION AMERICANS ARE ABOUT TO BECOME 'DANGEROUS'

You could be one.

Play **Elite** – it's totally stunning.

Elite is Britain's 1985 Adventure Game of the Year, an interstellar mind-game with incredible 3D Vector-Graphic space flight simulation

Take command of your Cobra MK III combat craft, trade with alien cultures on over 2000 planets in eight galaxies. Pick your destination on the starmap, checking out the computer's 4-way viewscan – and you're ready for your first jump thru hyperspace.

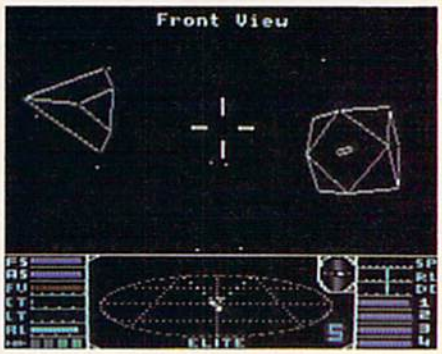
As a rookie you start with 'Harmless' status but with the right stuff and combat skills, you'll win ratings of 'Average' to 'Dangerous' – with your ultimate objective to become one of the **Elite**.

It's big, it's fast and it's here now for the **Commodore 64™** and **128™** complete with Manual, Novel, Control Guide, Ship Identification Chart, Keyboard Overlay **and** the opportunity as the US competition winner to get flown to London, England to try for the Elite World Championship.

It's so addictive it's been called "the Game of a Lifetime".

Elite.

Be dangerous.



FIREBIRD

P.O. BOX 49
NEW JERSEY 07446 USA.

GOLD EDITION

FIREBIRD HOTLINE ☎: 201 934 7373

large and more complex—a sorting routine that figures out mean and median, displays a hi-res graph, and puts the numbers into a relative file.

Building up a library of commonly used subroutines can save a lot of time when you start writing a new program. You don't have to look up the memory locations for the joystick or try to remember how a certain technique is put together; you can spend your time working on the main program.

For those curious about what the POKEs do, here's a brief explanation. Locations 43–44 point to the beginning of the BASIC program, and locations 45–46 keep track of the start of variables (SV in line 2). Two zeros separate the last byte of a program from the first variable. So, by PEEKing 45 and 46, converting the pointer to a regular decimal number, and subtracting two, we can find where the next line should be added. Next, line 3 figures out the high byte and low byte of SV, the previous start of variables minus two, and moves the start of BASIC up. Now, you just load the program to be appended, POKE 43 and 44 with their normal values, and the task is accomplished. You must load from immediate mode, because of the way the pointers are handled. You can't load from within the program. C

Play the new family trivia game set to music!

Remember all the great songs from movies and television when you were growing up? Now your Commodore 64 or 128 is challenging you to name them.

Tunes 'n Trivia, the new game from Sound Software, plays all the old favorites and even some new ones.

Once you or your teammates recognize a melody, you'll still have to deal with the trivia. Miss the easy questions and lose points. Get the tough ones correct and earn a big bonus.

Tunes 'n Trivia even takes an occasional time out for a word from a sponsor. Some of the best ad songs from TV are included for extra points.

Enjoy these special features:

- Up to 4 teams or players.
- Automatic score-keeping.
- No crowding around your computer . . . just one keyboard operator.
- Hundreds of tunes on each disk . . . no repeats.
- Future data disks include Beatlemania; Solid Gold from the 50's and 60's; New Generation hits of the 70's and 80's.

Order Tunes 'n Trivia by phone 24 hours a day. Or send check or money order for $29.95 plus $3.00 shipping and handling. Ohio residents add 5.5% sales tax.

MasterCard *Not available in retail stores.* VISA

SOUND SOFTWARE, LTD.

221 E. Avondale Ave. Youngstown, OH 44507

1-800-742-6188

Ohio residents only

1-216-742-6188

DATADISK SERIES

200 GRAPHICS

for CBM* and other Printers.

For use with PRINT SHOP PGM.*

Includes: Professional symbols, all 50 states, designs, animals, and many others.

$21.95 (2 Diskettes)

ALSO AVAILABLE

"MONSTER HELPER"

for use with MAIL ORDER MONSTER PGM.*

Includes: 64250 PHYCONS and Victory Points, with all monsters built to maximum potential.

$9.95 (1 Diskette)

Add $3.00 Shipping & Handling per order. N.Y. residents add 7% sales tax.

Send Cashiers Check or M.O. to:

NIBBLES & BITS
P.O. Box 33
West Hurley, N.Y. 12491

or call (914) 338-7527 for computer to computer C.O.D. ordering.

**Trademarks of Commodore Business Machines, Broderbund Software and Electronic Arts.*

Enter the ever-changing world of...

C·O·M·M·O·D·O·R·E 64*

This intriguing game will capture your imagination in many ways. Unlike the repetitive nature of most computer games, ELIDON is forever challenging, forever changing. Set in a secret forest, you must seek seven potions to make magical flowers bloom. You will meet dark places, evil spirits and other unknown perils in your hazardous quest, where secrets are not revealed easily.

A breakaway hit in Europe! Thousands of Commodore 64* users in England alone began the ELIDON quest in its first month of distribution! The incredible graphics and its intriguing, changing nature have challenged the best minds. To date, no-one except its designer has solved the mystery!

A substantial cash reward is offered to the first person completing this game! Other prizes will be allotted as well. Full details are enclosed with this remarkable game.

ORPHEUS
NEVER·LOOK·BACK...

Please send me my ELIDON on ☐ Diskette
☐ Cassette

PLEASE PRINT

Name _____

Address _____

Zip/Postal Code _____

Please enclose check or money order for
$CAN 29.95
$ US 22.50

Mail to:
Orpheus
Box 333, Elmira,
Ontario, Canada N3B 2Z7

* Commodore 64 is a trademark of Commodore Electronics Ltd.

Soundpix

Lawrence Cotton

This program helps you understand two of the most difficult aspects of Commodore 64 sound—waveforms and envelopes—by providing a sight and sound demonstration.

A picture is worth a thousand words. A picture is worth a thousand *sounds*, also, if the sounds happen to be generated by the Commodore 64. "Soundpix" is a short program that will help you see as well as hear the differences in the *waveforms* and *envelopes* of a sound. (If you've not been introduced to Commodore 64 sound, it is suggested that you read Chapter 4 and Appendix O in *The Commodore 64 Programmer's Reference Guide* and/or *COMPUTE!'s Beginner's Guide to Commodore 64 Sound*.)

The picture of the sound appears only seconds after you hear it. As many as three different sounds may be drawn side by side, so that they may be compared. The data that determines their shape is simultaneously displayed.

Sight And Sound

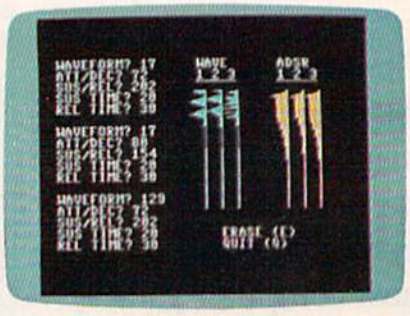
Save the program to disk or tape after typing it in, then run it. You'll next see a series of questions to which you should respond, for now, 33, 172, 56, 60, and 20. Press RETURN after each entry.

After a short pause, you'll hear a sound and see two graphs being drawn. The cyan graph on the left represents the waveform. There are four available waveforms on the 64: *triangle*, *sawtooth*, *square*, or *noise*. On the right, the yellow graph shows the sound's *attack*, *decay*, *sustain*, and *release*—the envelope. These are actual plots of values generated in two memory registers while the sound was playing. To display the graphs, I've used eight sprites, four for the waveform and four for the envelope.

What do they mean? Let's take the waveform first, since it's the easiest to understand. When you typed 33 for the waveform number, Soundpix POKEd it into control register 54290, which turned on, or *gated*, voice three's *sawtooth* waveform. Now you can *see* how sawtooth got its name. (The right sides of the graphs are the lowest values.) The character, or *timbre*, of a sound is directly related to the shape of its waveform.

After the graphs have been drawn, type C for Compare. This time enter 65 (for a square waveform) instead of 33 (sawtooth). The program will ask for the *pulse width*, so enter 8. (Pulse width is used only with the square wave.) Respond to the rest of the questions with the same numbers as you did in the first series.

Register 54290 is then POKEd with the 65, initiating the more mellow sound of the square wave, which should now be accompanied by a matching square wave graph. This 8 value insures that the wave



Soundpix offers a sight and sound demonstration, and it lets you compare sounds, as shown in this example.

is truly square; the ratio of cyan to black on the graph is about equal. If you type different values from 1 to 15, you'll get different percentages of cyan and black (and different sounds).

Be sure to listen to the triangle (17) and noise (129) waveforms also. The triangle waveform creates the smoothest sound and the smoothest graph or curve. And noise is created by random values—the waveform is anything but regular and smooth.

The Envelope

The *envelope* of a sound is its amplitude or loudness throughout its life. Run the program again, listen to the example sound, and look at the right-hand graph. Notice how the loudness of the sound follows the shape of the graph as it moves from top to bottom. Again, the right side of the graph reflects the lowest values (the quietest parts of the sound).

The rise in volume at the top of the curve is called the *attack*, which

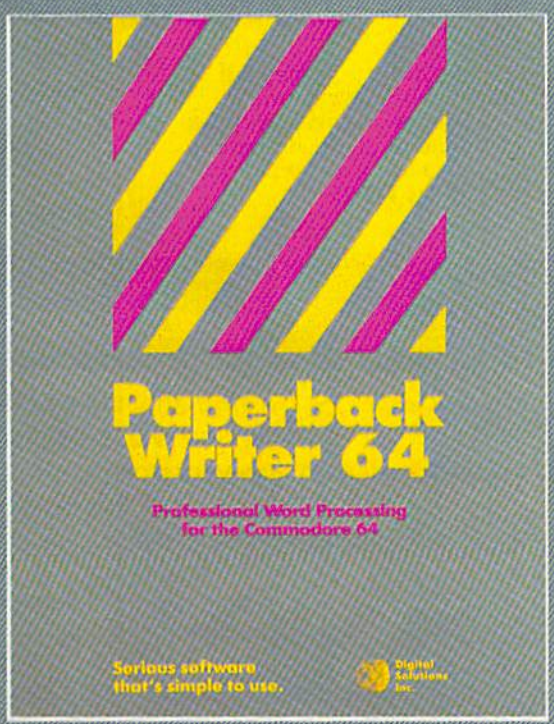
From one bestseller to another . . .

Paperback Writer 64

Word Processing Software for the Commodore 64 or 128

If we could arrange to have you sit down and use Paperback Writer, we wouldn't have to run this ad. The software would sell itself. The session would start with you wondering where the manual was. The fact is, you don't need one . . . Paperback Writer is 'leading-edge' sophisticated, yet with assistance throughout, it's extremely simple to use. **A manual would only waste your time.**

Paperback Writer is a revelation. What you see on screen is what you get. When you specify a format, you see it right away. Look at our exclusive visual on-screen text formatting like **boldface,** underline and ***italics*** . . . like page breaks and indents.


Paperback Writer 64
Professional Word Processing for the Commodore 64
Serious software that's simple to use.
Digital Solutions Inc.

You also get all of the other features you could hope for in serious word processing software like spelling checker, 40 or 80 column versions, and file compatibility with other popular word processors. You'll think you've stepped into the next generation of word processing and you know what? You have!

Paperback Writer is available in two versions . . . 64 or the new, faster 80 column 128. And Digital Solutions has a special offer for you. All registered Paperback Writer 64 owners can receive a 128 upgrade disc for only $15 (U.S.) through Digital Solutions. (Please add $3.00 shipping and handling)

With Paperback Writer, you'll adore your Commodore even more. Oh, and one more thing . . . you can order Paperback Writer 64 from Crystal Computer **for only $39.95** (U.S.) (Paperback Writer 128 for only $49.95 U.S.)

Talk about a happy ending.

For orders only call: **Crystal Computer Inc.**
In Michigan 1-517-224-7667
Outside Michigan 1-800-245-7316
Lines open 24 hours a day, 7 days a week.

For dealer inquiries call:
Allegro Tech
In Massachusetts 1-413-443-9443
Outside Massachusetts 1-800-544-1004
Lines open 24 hours a day, 7 days a week.

For information write to:
Digital Solutions
P.O. Box 345, Station A
Willowdale, Ontario
M2N 5S9

A *SPECIAL OFFER* from COMPUTE! Books

for Owners and Users of Commodore Computers

Buy any two of these books and receive a ***15% Discount***. You pay $22.00 and save $3.90!
Buy all three books and get a ***25% Discount***. You pay only $29.00, a savings of $9.85!

An excellent resource for users of the 64, with something for everyone: BASIC programming techniques, a memory map, a machine language monitor, and information about writing games and using peripherals. This 264-page spiral-bound book includes many ready-to-type-in programs and games. **$12.95**

Continues in the tradition of the *First Book of Commodore 64* in presenting some of the best programs and articles from COMPUTE! Publications, many revised or never before published. There's something for almost any Commodore 64 user in this 289-page book: arcade and text adventure games in BASIC and machine language, a commercial software-quality word processor, a program which adds 41 new commands to BASIC, an electronic spreadsheet, tutorials about programming sound and graphics, and utilities for saving, copying, and retrieving files. **$12.95**

A collection of outstanding games, applications, tutorials, and utilities from the most recent issues of *COMPUTE!* magazine and *COMPUTE!'s Gazette*, including several programs never before published. Commodore 64 users of all ages and experience will find this book informative, entertaining, and educational. Create an 80-column display, play educational and arcade-quality games, compose music, move sprites easily and quickly, and see how to program more efficiently and effectively. **$12.95**

Buy Now—This Offer Expires January 10, 1986

Yes! I want to save money while I enjoy COMPUTE! Books.
_____ COMPUTE!'s First Book of Commodore 64, $12.95
_____ COMPUTE!'s Second Book of Commodore 64, $12.95
_____ COMPUTE!'s Third Book of Commodore 64, $12.95

All Orders Must Be Prepaid
☐ Payment Enclosed (check or money order)
☐ Charge ☐ MasterCard ☐ Visa ☐ American Express

Acct. No. _____ Exp. Date _____

Name _____

Address _____

City _____

State _____ Zip _____

To Order Call Toll Free **800-334-0868**
(in NC call **919-275-9809**)
or mail this coupon with your payment to:
COMPUTE! Books, P.O. Box 5058,
Greensboro, NC 27403

Please send me:
☐ 1 Book for $12.95
☐ 2 Books for $22.00
☐ 3 Books for $29.00

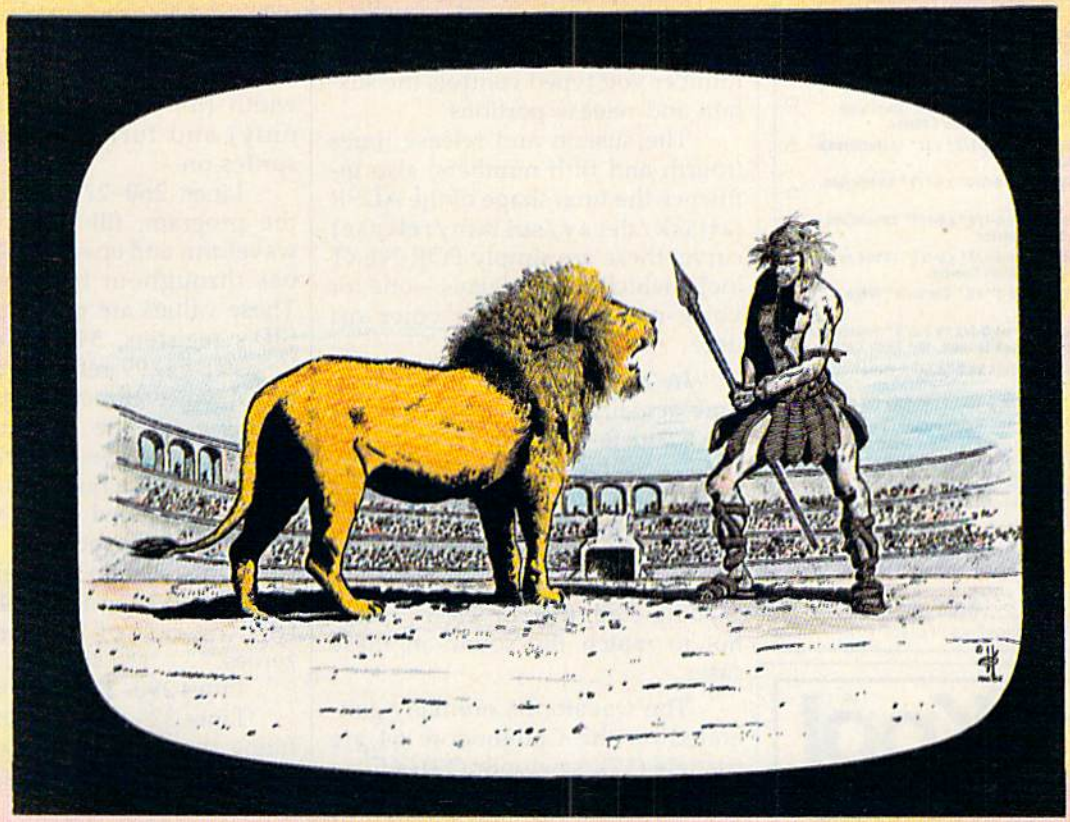
NC residents add 4.5% sales tax _____
Add $2.00 per book for shipping _____
Total Paid $_____

Please allow 4-6 weeks for delivery. 75D1182

FOR ATARI® 48K 800, XL's AND XE's AND COMMODORE 64/128™

THE GLADIATOR

FREE GAME OFFER! GHOST HUNTER II™ Retail Value $29.95 Purchase of THE GLADIATOR required



THE DUST AND DANGER OF THE ARENA . . . THE ULTIMATE SURVIVALIST STANDING ALONE AGAINST THE BEASTS AND BRUTALITY OF A BYGONE ERA . . . THE GLADIATOR MUST PROVE HIS CUNNING AND ENDURANCE IN THE COLISEUM OF DEATH. AGAINST ALL ODDS . . . HE MUST SURVIVE!

THE ORIGINAL SPECTATOR SPORT

Ask for THE GLADIATOR™ at your local computer retailer. Or send $29.95 plus $4.00 shipping and handling (CA residents please add 6% sales tax) to receive THE GLADIATOR™ and your FREE copy of GHOST HUNTER II™ as soon as possible. Please indicate desired version Atari® or Commodore® and cassette or diskette. Allow 2 to 3 weeks for delivery.

Richwood™ SOFTWARE

©1985 Richwood Software

3011 Alhambra Drive, Suite C, Cameron Park, CA 95682 (916) 677-6779

CHF™

CHECK & STATIONERY VINYL CARRIERS FOR ADJUSTABLE TRACTOR-TYPE PRINTERS

Allow quick computer processing of conventional checks, stationery, index cards, invoices, purchase orders etc.
Check Carrier comes with BASIC program.
Indicate carrier you wish to order:

- ☐ S-100 Holds Eight 2-3/4" x 6" Personal Size Checks. 8" Wide Carrier.
- ☐ S-101 Same as above. 9-1/2" wide for Non-Adjustable Printers. ($1.00 extra).
- ☐ S-102 Holds Eight 2-3/4" x 6-1/4" Canadian Size Personal Checks. 8" Wide Carrier.
- ☐ S-200 Holds Six 3-1/8" x 8-1/4" Business Size Checks. 9-1/2" Wide Carrier.
- ☐ S-707 Holds Three 8-1/2" x 11" Letterheads. 10" Wide Carrier.
- ☐ S-303 Holds Five 3-5/8" x 6-1/2" Envelopes. 8" Wide Carrier.
- ☐ S-309 Holds Five 4-1/8" x 9-1/2" Envelopes. 10-1/2" Wide Carrier.
- ☐ S-505 Holds Five 3-1/2" x 5-1/2" Index or Post Cards. 8" Wide Carrier.
- ☐ S-515 Holds Five 3" x 5" Cards. 8" Wide Carrier.
- ☐ S-808 Holds Three 8-1/2" x 7-5/8" Vouchers, Invoices, or Quick Letters. 10" Wide Carrier.
- ☐ S-824 Holds Labels on 9" x 1/2" Wide Carrier.

ONLY $11.95 INCLUDES POSTAGE AND HANDLING

Carriers also available for other types and sizes of stationery!

Send check or money order. Ohio residents add 5-1/2% sales tax. Allow two weeks for delivery. Be certain to specify model. VISA & MasterCard accepted.

THE CHF COMPANY
P.O. BOX 185 • OBERLIN, OH 44074
216/775-7338
"CompuServe"—EMAIL" 74266.601"
DEALER INQUIRIES INVITED!

Uni-Kool
DISK DRIVE FAN FOR COMMODORE

Designed to work with Commodore Disk Drive Models 1540, 1541, SFD 1001, the quiet C-100 fan enclosure moves cool, filtered air through the top vents of the disk drive cooling the drive and thereby reducing the misalignment problems caused by heat build-up. A custom filter keeps room dust from entering the disk loading opening. This greatly increases the life span of the disk drives, and decreases the maintenance required to keep the drive functioning properly. Only $39.95 plus $2.50 for shipping and insurance.

115 vac

Money Order, Checks or C.O.D. Only

6-month warranty

Uni-Kool (503) 476-1660
909 Williamson Loop, Grants Pass, OR 97526

(Commodore is a registered trademark of Commodore Business Systems)

starts as soon as the voice is turned on. The next part of the sound's lifetime is called *decay*. The second number you typed controls the attack and decay. The sound decays from its highest attack level to the *sustain* level, which is the middle portion of the curve.

Last is the *release* portion of the curve. It starts when register 54290 is turned off, and is the last (or bottom) part of the curve. The third number you typed controls the sustain and release portions.

The sustain and release times (fourth and fifth numbers) also influence the final shape of the ADSR (attack/decay/sustain/release) curve; these are simply FOR-NEXT loops which create delays—one for voice-on time, one for voice-off time.

In any envelope, the sustain time actually starts as soon as the voice register is gated. Thus, it's entirely possible for one part of the curve to "override" and obliterate another. Sometimes the decay is so long that the release portion of the curve starts before the sustain time is completed; the curves will seem not to match the sound in these cases.

The waveforms normally generated on the Commodore 64 are triangle (17), sawtooth (33), square (65), and noise (129), but you may type in any number between 1 and 255 (23 and 85 are also interesting). For the attack/decay and sustain/release values, you may type any numbers from 1–255. However, the sustain and release times *must* add to 84 or less. The program will check for these values.

Program Description

By studying the program listing, you can learn more about how to program sound on the 64.

Lines 10–30 set up the screen and define constants and variables.

Line 40 clears the sound chip, and POKEs a 143 to 54296 for maximum volume and to turn off voice three's audio. (You're actually hearing voice one, which is POKEd with the same values that go to voice three.)

Lines 50 through 80 set up the eight sprite pointers and locate the sprites.

Line 90 paints the first four sprites cyan and the second four yellow. Line 100 expands them all horizontally.

Line 110 POKEs frequencies to voices one and three (voice one's is higher).

Lines 120–230 gather input and check it for validity in a subroutine at line 560.

Line 240 POKEs the input envelope values to voices one and three.

Line 250 POKEs the pulse width (for use with square wave only) and turns the voices and sprites on.

Lines 260–270, a key part of the program, fill two arrays—for waveform and envelope—with values throughout the sound's life. These values are read from two of SID's registers, 54299 and 54300. Register 54299 reflects the character of voice three's *waveform* and 54300 reads the output of voice three's *envelope* generator. The character of the numbers generated is directly related to the waveform and envelope specified.

If the sustain and release time do not add to at least 84, line 280 fills the rest of the arrays with zeroes.

Lines 290–310 print the screen.

Lines 320–390 draw the graphs, filling them up by thirds, depending on the starting value of Q (initially 12288).

Lines 400–440 print appropriate messages under the graphs, depending on whether they're filled or not.

Lines 450–500 wait for and react to the user's response. If the erase response is selected, the program is RUN from the beginning. If quit is selected, the program ends with a normal screen. If C (for compare) is pressed and the graphs are not full, the beginning address for the next incoming sprite data is defined and the cursor position is incremented so that the input information is displayed sequentially.

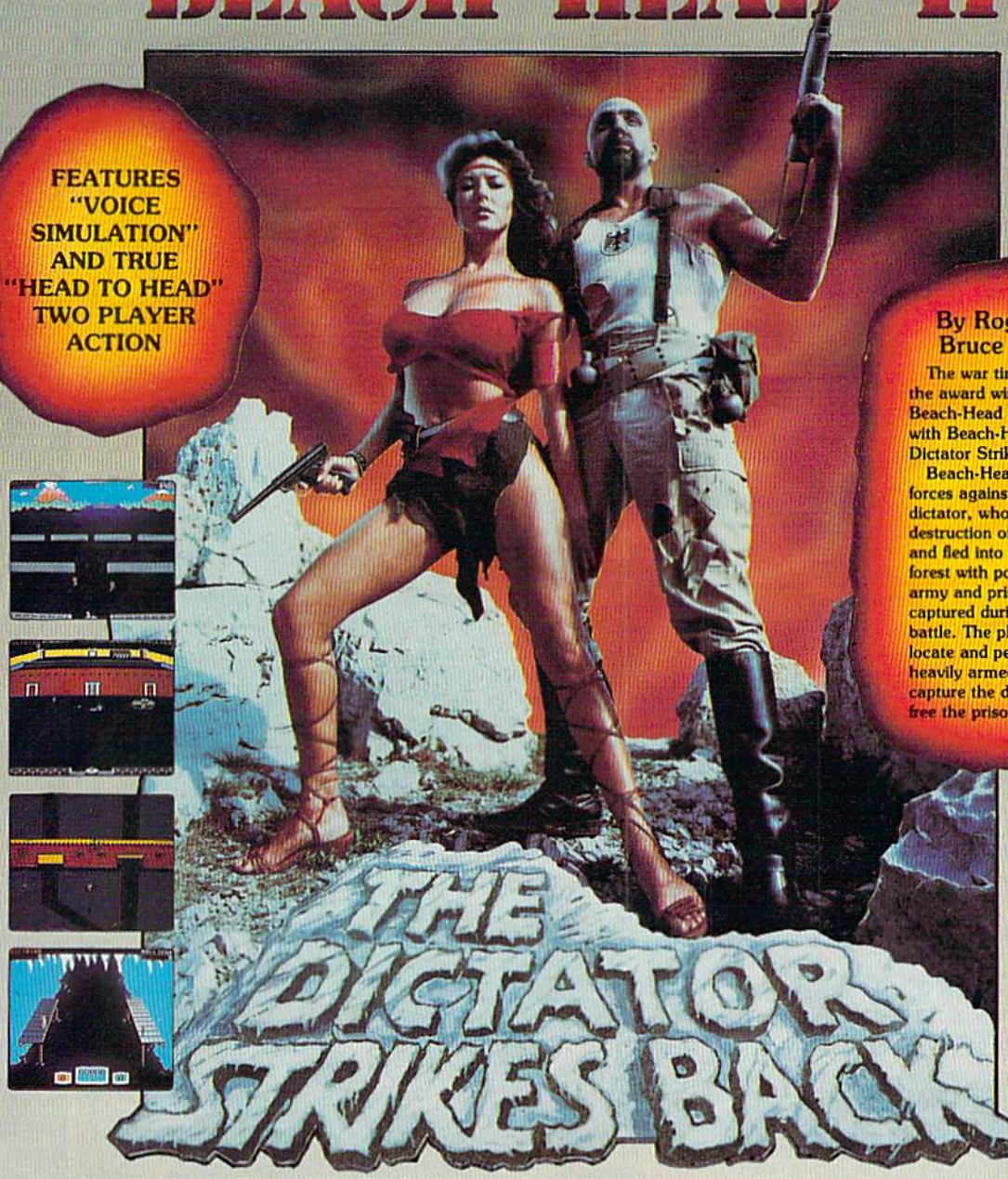
Lines 510 and 520 are subroutines for POKEing the two arrays' values to the sprite data registers, thus "drawing" the graphs.

Lines 530–550 are the subroutine to assign a pulse width when the square wave is selected.

Lines 560–580 check for validity of input data.

See program listing on page 143.

BEACH-HEAD II



FEATURES "VOICE SIMULATION" AND TRUE "HEAD TO HEAD" TWO PLAYER ACTION

By Roger and Bruce Carver

The war time drama of the award winning game Beach-Head continues with Beach-Head II, "The Dictator Strikes Back."

Beach-Head II pits allied forces against the cruel dictator, who escaped the destruction of the fortress and fled into the tropical forest with portions of his army and prisoners captured during the land battle. The player must locate and penetrate the heavily armed sanctuary, capture the dictator, and free the prisoners.

THE DICTATOR STRIKES BACK

$39.95

AVAILABLE ON DISK FOR COMMODORE 64/128, APPLE II+/E/C, ATARI 48K

TRY THESE OTHER FINE ACCESS PRODUCTS

MACH 5™

NEW

CARTRIDGE FAST LOADER

- Load programs up to 500% faster.
- Full help menu at the touch of a key.
- Eliminate 1541 disk drive rattle.
- Print screen (screen dump to printer).
- Restore basic program (old).
- List disk directory without erasing program in memory.
- Pause or exit from directory listing.
- Execute short hand load commands from directory.
- Auto run any basic program.
- Open and close printer channels with a single key.
- Disable and re-enable features without turning off computer.
- Compatible with all popular printers.
- Send dos command (@).
- Load virtually 95% of all software, even copy protected games.
- Completely transparent. Does not disturb ram.

$34.95

Compatible with your Commodore 64/128 and 1541, Indus GT, Enhancer 2000 or Tech 16.

BEACH-HEAD™

"The graphics are remarkable—it's almost like watching a John Wayne Movie."

—Computer Games

$34.95

Commodore 64/128, Atari 48K

RAID OVER MOSCOW™

"Raid Over Moscow is action gaming at its finest—realistic graphics, superb sound effects and highly challenging tests of skill."

—Home Computing & Video News

$39.95

Commodore 64/128

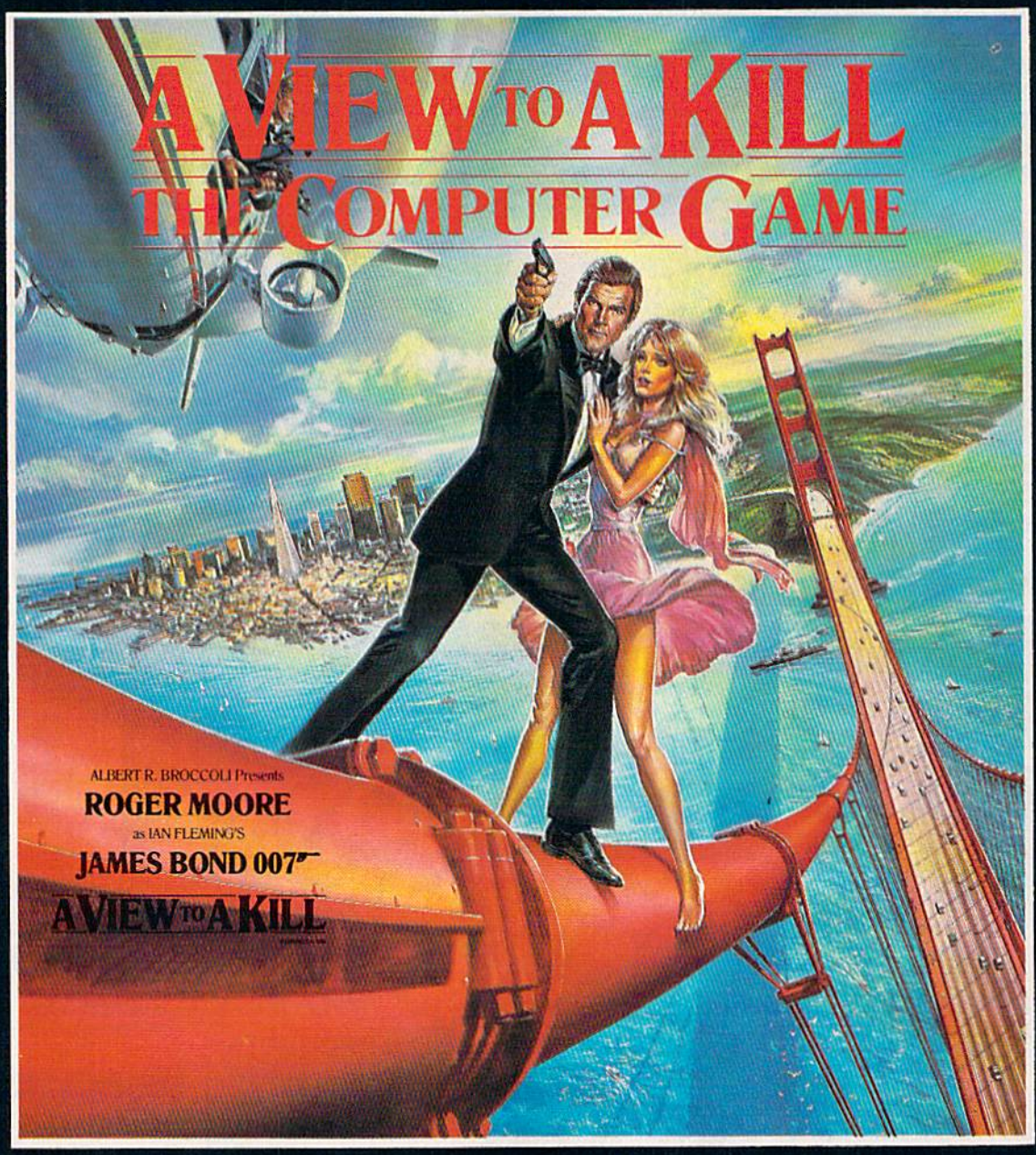
ACCESS Software Incorporated

VISIT YOUR FAVORITE RETAILER . . .

For mail orders, enclose check or money order, plus $2.00 shipping and handling, and specify machine version desired. Order by phone on Visa, MasterCharge or C.O.D. by calling 801/298-9077.

ACCESS SOFTWARE, INC. 2561 So. 1560 W. Woods Cross, UT 84087

DOMARK



THREE STRATEGIC ARCADE GAMES IN ONE

NOW AVAILABLE ON COMMODORE 64 DISK
FEATURING THE COMPUTERISED VERSION OF THE HIT SINGLE
'A VIEW TO A KILL' BY DURAN DURAN AND JOHN BARRY

All enquiries to sole USA Distributors
LINDNER CONTRACTS LTD.
15000 N.W. Freeway, Suite 205, Houston, Texas 77040
Tel: (713) 466 3175 Telex: 790401 LIN HOU

© Eon Productions Ltd. Glidrose Publications Ltd. 1985

Disk File Archiver

Keith Lossett

Have you ever listed your directory and wondered which is the latest version of that program you've been writing? This short machine language program can help. For the Commodore 64.

Anyone who programs on the 64 and has disk files with names like PROG.3, XYZ BACKUP, or TEMP37, will find "Disk File Archiver" a useful utility. It's a short machine language program that eliminates the need to choose a unique filename or use the undependable Save-with-Replace command when you make program revisions.

With Archiver safely hidden away in memory, you can always save the latest revision with the same filename.

For example, let's say you begin writing a program which you save with a filename of "BUDGET". After saving, you decide to make modifications, additions, or do some debugging. You can't save the new version as "BUDGET" because there's already a file with that name. Normally, you'd have to scratch the previous file, rename it, or think of a new name like "NEWBUDGET" for the latest file.

But Archiver simplifies things. Say you saved the original program with the name "BUDGET". After making revisions, you save your next version with the same filename, "BUDGET", and Archiver saves it with this filename. The original version is automatically renamed "BUDGET.1". If this process is repeated, the original version becomes "BUDGET.2", the previous version becomes "BUDGET.1", and the current version becomes "BUDGET".

Archiver saves up to five versions of a program. Here's how it works:

BUDGET—the most recent version of the program

BUDGET.1—the previous version

BUDGET.2—the version before BUDGET.1

BUDGET.3—the version before BUDGET.2

BUDGET.4—the version before BUDGET.3

Archiver keeps only the current version of a program and its four predecessors. So if you have six versions of BUDGET, the oldest version is gone. Or say you've saved ten versions of BUDGET before deciding that you're satisfied with the results. If you list your directory, you'll see the five most recent versions.

Typing It In

Archiver is written entirely in machine language and is listed in MLX format, found elsewhere in this issue. After loading and running MLX, enter the following when prompted:

Starting Address: 49152
Ending Address: 49577

Type in Archiver and save a copy. To use the program, load it and type RUN (there's no need to SYS). Be sure to leave your disk drive on after loading Archiver. Also, note that when the program is run, the system appears to reset as if you just switched on the computer. The usual COMMODORE 64 BASIC V2 message appears, but you'll notice that the number of bytes free is less than the usual 38911. One final note: Do *not* specify a drive number (SAVE "0:*filename*",8). Archiver adds the *0:* automatically.

See program listing on page 143.

Davidson is #1, #1, #1, & #1 in Education

For math, speed reading, spelling and vocabulary, Davidson's award winning software outsells all others. Why? Because enough people choose to buy the educational software that **works**.

MATH BLASTER makes it more fun to add, subtract, multiply, divide, and learn fractions, decimals and percents. First through sixth graders master 600 math facts with exciting graphics, animation, sound effects...even an arcade game. Apple™, Macintosh™, IBM™, Commodore 64/128™, Atari™. 49.95.

SPEED READER II can quadruple your reading speed and improve your comprehension. Develop good reading habits, chart your progress, and have fun! For high school age through adult. Apple II™, Macintosh™, IBM™, Commodore 64/128™. 69.95

WORD ATTACK lets students ten through adult discover the meanings and usages of 675 new words. Includes a fun, fast-action arcade game and add-your-own-words editor. Apple™, IBM™, Commodore 64/128™, Atari™. 49.95

SPELL IT teaches ten year olds and older how to spell a thousand and one of our most commonly misspelled words. Vivid graphics, animation, sound effects, a lively arcade game and add-your-own-words editor, too! Apple™, IBM™, Commodore 64/128™, Atari™. 49.95

Davidson & Associates, Inc.
800-556-6141
(In Calif., 213-534-4070)

Davidson.
Davidson & Associates, Inc.
3135 Kashiwa St. / Torrance, CA 90505

teacher certified NEA

Please send me a FREE COLOR BROCHURE and the name of my nearest Davidson Dealer.

Name _____
Address _____
City _____ State _____ Zip _____

Educational Software that Works

CG

Auto Time And Date

David Archibald

If you program with a 64 and disk drive, this handy utility can prevent confusion over which is the most current version of a program. It marks each program with the date and time, like an automatic rubber stamp.

When writing a BASIC program, I usually have several different versions of it on disk. It's easy to forget which one is the latest version. Some computers—like the IBM PC— automatically record the time and date when a program is saved. You can tell at a glance which copy is the latest version.

"Auto Time And Date" provides a similar feature for the Commodore 64. It automatically puts the current date and time into the first line of a BASIC program.

REM Time

For this program to work, the first line in your program must be a REM statement. You must then follow the REM with at least 18 characters. It doesn't matter which letters you use because they're going to be replaced with the date and time. If you enter more than 18 characters, they'll automatically be deleted.

Should you forget to include a REM statement at the beginning of your program, Auto Time And Date will not destroy the first line. If it doesn't find a REM here, it does nothing.

Type in Auto Time And Date and be sure to save a copy *before* running it the first time because it erases itself from memory. It first asks you to enter today's date. If, for example, today's date is December 21, 1985, enter:

```
12/21/85
```

and press RETURN. You must enter eight characters, or you'll get an error message.

Next, enter the present time. If the time is, say, 9:35, enter:

```
0935
```

Four digits are required (no colon). Then AM or PM is requested. Enter A or P.

The time and date are displayed and you're asked if they're correct. If they are, press RETURN. If not, type N and press RETURN. You'll be prompted for the time and date again.

Now load or type in a program and enter something like this as your first line:

```
10 REM 18 CHARACTERS OR MORE
```

Now when you list your program, the first line will contain the date and time:

```
10 REM 12/21/85 09:35 PM
```

The time is updated each time you save or list your program—provided Auto Time And Date is still activated. The date is not changed when the time passes midnight.

How The Program Works

Auto Time And Date is a machine language program in the form of a BASIC loader. The machine language is located at 49155 but is relocatable, so you can put it elsewhere. Change the value of variable SA in line 100 to the new starting address.

The program works by changing the vectors for the LIST and SAVE routines to point to the machine language routine. Each time you enter the command LIST or SAVE, BASIC will jump to the machine language routine first. The routine updates the time on the first BASIC line and then jumps to the regular SAVE or LIST routine.

It uses the Time Of Day (TOD) clock, which is located in the CIA #1 chip. For more information on this clock see the *Commodore 64 Programmer's Reference Guide.*

See program listing on page 143.

A Printer For All Reasons

Search For The Best High Quality Graphic Printer

If you have been looking very long, you have probably discovered that there are just too many claims and counter claims in the printer market today. There are printers that have some of the features you want but do not have others. Some features you probably don't care about, others are vitally important to you. We understand. In fact, not long ago, we were in the same position. Deluged by claims and counter claims. Overburdened by rows and rows of specifications, we decided to separate all the facts — prove or disprove all the claims to our own satisfaction. So we bought printers. We bought samples of all the major brands and tested them.

Our Objective Was Simple

We wanted to find that printer which had all the features you could want and yet be sold directly to you at the lowest price. We didn't want a "close-out special" of an obsolete product that some manufacturer was dumping, so we limited our search to only those new printers that had the latest proven technology. We wanted to give our customers the **best** printer on the market today at a bargain price.

The Results Are In

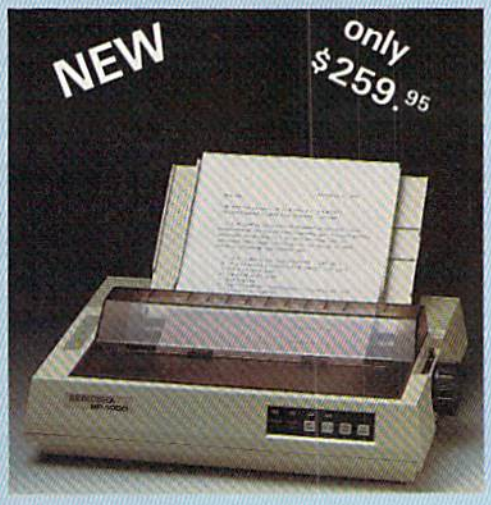
The search is over. We have reduced the field to a single printer that meets all our goals (and more). The printer is the SP-1000 from Seikosha, a division of Seiko (one of the foremost manufacturers in the world). We ran this printer through our battery of tests and it came out shining. This printer *can* do it all. Standard draft printing at a respectable 100 characters per second, and with a very readable 12 (horizontal) by 9 (vertical) character matrix. This is a full bi-directional, logic seeking, true descender printer.

"NLQ" Mode

One of our highest concerns was about print quality and readability. The SP-1000 has a print mode termed Near Letter Quality printing (NLQ mode). This is where the SP-1000 outshines all the competition. Hands down! The character matrix in NLQ mode is a very dense 24 (horizontal) by 18 (vertical). This equates to 41,472 addressable dots per square inch. Now we're talking ***quality*** printing. It looks like it was done on a typewriter. You can even print graphics using the standard graphics symbols built into your computer. The results are the best we've ever seen. The only other printers currently available having resolution this high go for $500 and more *without* the interface or cable needed to hook up to your computer.

Features That Won't Quit

With the SP-1000 your computer can now print 40, 48, 68, 80, 96, or 136 characters per line. You can print in ANY of 35 character styles including 13 double width and 3 reversed (white on black) styles. You not only have the standard Pica, Elite, Condensed and Italics, but also true Superscripts and Subscripts. Never again will you have to worry about how to print H_2O or X^2. This fantastic machine will do it automatically, through easy commands right from your keyboard. Do you sometimes want to emphasize a word? It's easy, just use **bold** (double strike) or use *italics* to make the words stand out. Or, if you wish to be even more emphatic, underline the words. You can combine many of these modes and styles to make the variation almost endless. Do you want to express something that you can't do with words? Use graphics with your text — even on the same line. You have variable line spacing of 1 line per inch to infinity (no space at all) and 143 other software selectable settings in between. You can control line spacing on a dot-by-dot basis. If you've ever had a letter or other document that was just a few lines too long to fit a page, you can see how handy this feature is. Simply reduce the line spacing slightly and . . . VOILA! The letter now fits on one page.



Forms? Yes!
Your Letterhead? Of Course!

Do you print forms? No problem. This unit will do them all. Any form up to 10 inches wide. The tractors are adjustable from 4 to 10 inches. Yes, you can also use single sheets. Plain typing paper, your letterhead, short memo forms, labels, anything you choose. Any size to 10" in width. In fact this unit is so advanced, it will load your paper automatically. Multiple copies? Absolutely! Use forms (up to 3 thick). Do you want to use spread sheets with many columns? Of course! Just go to condensed mode printing and print a full 136 columns wide. Forget expensive wide-carriage printers and changing to wide carriage paper. You can now do it all on a standard 8½" wide page, and you can do it quietly. The SP-1000 is rated at only 55 dB. This is quieter than any other impact dot matrix printer that we know of and is quieter than the average office background noise level.

Consistent Print Quality

Most printers have a ribbon cartridge or a single spool ribbon which gives nice dark printing when new, but quickly starts to fade. To keep the printers output looking consistently dark, the ribbons must be changed quite often. The SP-1000 solves this problem by using a wide (½") ribbon cartridge that will print thousands of pages before needing replacement. (When you finally do wear out your ribbon, replacement cost is only $11.00. Order *#2001.)*

The Best Part

When shopping for a printer with this quality and these features, you could expect to pay around $500 or more. *Not now!* We sell this fantastic printer for **only $259.95! You need absolutely nothing else to start printing — just add paper.**

No Risk Offer

We give you a 2-week satisfaction guarantee. If you are not completely satisfied for any reason we will promptly refund your purchase. A 1-year warranty is included with your printer. The warranty repair policy is to repair or replace and reship to the buyer within 72 hours of receipt.

The Bottom Line

Be sure to specify the order # for the correct version printer designed for your computer.

Commodore C-64 & C-128, Order #2200, cable included

IBM-PC and compatibles, Order #2100, plus 8' cable #1103, $26.00

Standard Parallel with 36 pin Centronics connector, Order #2400, no cable

We also have interfaces and cables for other computers not listed. Call Customer Service at 805/987-2454 for details.

Shipping and insurance is $10.00 — UPS within the continental USA. If you are in a hurry, UPS Blue (second day air), APO or FPO is $22.00. Canada, Alaska, Mexico are $30.00 (air). Other foreign is $70.00 (air). California residents add 6% tax. The above are cash prices — VISA and MC add 3% to total. We ship the next business day on money orders, cashiers' checks, and charge cards. A 14-day clearing period is required for checks.

For information call 805/987-2454

TO ORDER CALL TOLL FREE

1-(800) 962-5800 USA
1-(800) 962-3800 CALIF. **(8-6 PST)**

or send order to:

APROTEK

1071-A Avenida Acaso
Camarillo, CA 93010

Nobody stacks up to Blue Chip peripherals for cost, compatibility and quality.

Nobody!

We can prove it three ways.

Blue Chip's Commodore* Floppy Disk Drive is 100% compatible with Commodore computers. It reads and writes programs much faster than the Commodore disk drive; it's more compact, draws less power and generates less heat.

And it's compatible with thousands of programs already written for Commodore computers.

Blue Chip's M120/NLQ Dot Matrix Printer combines two print modes *and* graphics all in one printer.

In near letter quality mode, it prints 25 characters per second (cps). In data processing mode, it sizzles along at 120 cps.

Our D12/10 comes with free word processing software.

And look: a Commodore interface (which works with the Commodore 64 and 128, SX 64, C16, Plus 4 and Vic 20) is included – there's nothing to add!

Typewriter quality, the D12/10 prints 12 cps bi-directionally. Vary pitch and line height. Boldface printing and justification, too.

You'll also enjoy the benefits of interchangeable daisywheels for printing in U.S. and U.K. English, French or German.

We think this all proves compatibility and quality. As for cost, well...that's one you can prove for yourself. Just shop around.

Blue Chip peripherals. Nobody else stacks up.

See one today. Blue Chip peripherals are available at Best Products, K-Mart, LaBelle's, Target Stores, Venture, Dolgin's, Jafco, Crazy Eddie, Toys-R-Us, Federated Group and other fine stores. Or call (602) 829-7217 for more information on the name of your nearest Blue Chip dealer.

*Commodore is a registered trademark of Commodore Business Machines Corp.

BLUE CHIP
ELECTRONICS
2 W. Alameda Dr., Tempe, AZ 85282

Soft Write Protector For Disks

Don Lewis

It's too easy to accidentally scratch an important program, especially if you often use the wild card symbols. Here are two utilities that allow you to lock and unlock individual files—or entire disks. For the 128, 64, VIC, Plus/4, and 16.

Write protecting a disk typically involves covering up the write protect notch. This works fine until someone removes the tag. If you really want to protect a program (or disk) from being scratched, "File Protector" and "Disk Protector" are the solution.

Once a file or disk has been protected, the scratch command will be disabled. You can load protected programs, read protected files, rename them, copy them, and so on. You just can't scratch the files. (Note that this is not the same as *copy protection*, a collection of techniques for preventing software piracy.) The programs simply protect files against accidental scratches. Anyone who keeps archive or backup files, including schools and user groups, should find it useful.

File Protector

Program 1 locks individual disk files. There are no special typing instructions; just type it in and save a copy. When you run it, follow the prompts on the screen. It lists programs and files on your disk, up to eight at a time. Each program should be numbered. When you see the file you want to lock, press the corresponding key.

If you discover you need to unlock a file so it can be scratched, load File Protector and list line 100. Change **P$="LOCK"** to **P$="UNLOCK"** and run it. Select the files to be unlocked by pressing the number next to the filename.

Locked files will always have a less-than sign (<) to the right of the file type. Should you choose to lock a program called TAPIR and a sequential file called SOMEDATA, they would look like this when you list the directory:

```
11  "TAPIR"          PRG<
17  "SOMEDATA"       SEQ<
```

Curiously, the ability to lock a file was included in the disk operating system (DOS), but Commodore didn't provide a direct command for locking a file. You have to read the directory sector by sector into a buffer and then use memory manipulation commands to change the appropriate bytes.

Disk Protector

The Disk Protector and Disk Unprotector programs are much shorter—about ten lines each. You don't have to choose which program will be unscratchable; Disk Protector affects the entire disk.

To lock a disk, load Program 2. Insert the disk you want to lock and run the program. It's that simple. To reverse the process, load Program 3, insert the locked disk, and run. Normally, the first line of a directory contains a 0, the disk name, the ID, and a "2A". On protected disks, the 2A will be changed to a 2P ("P" for "Protected").

Here's how it works: Commodore has used several versions of DOS over the years. The 1541, like the 4040 (a disk drive for the Commodore PET), contains DOS version A. The identifying letter A (CHR$(65)) is found on track 18, sector 0, byte 2. When a disk is first accessed or when it is initialized, the letter A is copied into location $0101 of the 1541's memory. It also gets copied, along with the entire block allocation map (BAM) into page 7. Since it's at byte 2 on the disk sector, it ends up at location $0702 in drive memory.

If the DOS detects a character that's not an "A," it thinks the disk was formatted on another version of DOS, so it allows files to be read, but not written to. Attempts to write a file or save a program to a protected disk cause an error #73: DOS Mismatch.

Unprotecting the disk requires a little trick. Since the disk has been write-protected, the DOS version identifier at track 18, sector 0 cannot be directly changed back to an "A". We have to tell the disk drive that it's working with a 1541-compatible disk. Before writing back to track 18, we have to send a memory-write (M-W) command to modify the memory locations that contain the DOS version (remember, the A on the disk has been copied into the disk drive's memory at $0101 and $0702). With that done, the disk drive believes that it's got the right kind of disk and we can write the letter A back to track 18, unlocking the disk.

I'd like to acknowledge the book *Inside Commodore DOS* by Richard Immers and Gerald Neufeld (1984, Datamost). The 1541 memory maps published in this book were very useful.

A Word Of Caution

Improperly typed disk commands can wreak havoc on information stored on a disk. Carefully type each line, and double check punctuation marks like commas, semicolons, colons, and quotation marks. When you've finished typing, test the programs by locking and unlocking a junk disk, just in case something was typed wrong.

See program listings on page 145.

ORDERS ONLY...CALL TOLL FREE
1-800-468-9044
INFORMATION & PA ORDERS 814-234-2236
EXTENDED HOLIDAY HOURS: NOV 24-DEC 25: 9-10 M-F, 10-6 S-SUN
REGULAR HOURS: 9-8 Mon-Fri, 10-5 SAT EAST COAST TIME

HOLIDAY SPECIALS

PRINTER PACKAGE MANIA!

all packages work with C64 or C128

SG-10 & XETEC SUPERGRAPHIX . . $274.95

- SG-10 & Xetec Supergraphix jr $254.95
- SG-10 & Cardco G-Wiz $264.96
- SG-10 & MW-350 . . . . . $275.95
- SG-15 & Xetec Supergraphix $419.95
- SG-15 & Cardco G-Wiz $412.95
- SD-10 & Xetec Supergraphix $384.95

PANASONIC

- 1091 & Xetec Supergraphix $289.95
- 1091 & Cardco G-Wiz $285.95
- LX-80 & Xetec Supergraphix $274.95
- LX-80 & Cardco G-Wiz $269.95
- FX-85 & Xetec Supergraphix $387.95
- FX-185 & Xetec Supergraphix $529.95

SG-10 . . . . . $CALL
SG-10C $236
Commodore ready
SG-15 . . . . . $364
SD-10 . . . . . $323
SD-15 . . . . . $449
POWERTYPE . . $299
18cps daisywheel
SR-10, SR-15 . . . . . $CALL

LX-80 . . . . . $219.00
LX-80 tractorfeed . . . . . $ 34.95
Homewriter 10 . . . . $246.95
includes Commodore or Atari interface
FX-85 . . . . . $323.95
FX-185 . . . . . $469.00

PANASONIC

- 1091 . . $229.00
- 1090 . . . . . $186.95
- 1092 . . . . . $349.00
- 1093 . . . . . $CALL

Xetec inc.

SUPER GRAPHIX printer interface w/8K buffer, and down loadable character fonts. Simply the best interface made . . . . . **$ lowest price**

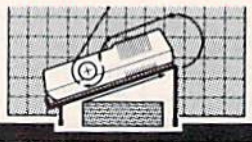
SUPERGRAPHIX jr printer interface . . $46.95

FONT MASTER . . $24.95

Quick Shot 1
from Spectravideo. Joystick with 2 fire buttons, contour grip design
only $7.95

HUSH 80 CD $74.95
Commodore ready thermal printer

KENSINGTON
PRINTER STAND . . . $19.95
w/any printer **$14.95**

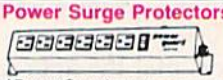


Legend 808 Printer

This printer may offer the best price/performance ratio in the business at 100cps, with tractor and friction feed. Its square pins give it a very good print quality.

Our Price $159.00

Power Surge Protectors



Inland Power Guard protects computers, TVs, VCRs, etc. against power surges, spikes, noise. 6 outlets, built in circuit breaker **$23.95**

Curtis SAFE-STRIP; 6 outlet surge, spike noise protection. Fused **$25.95**

PRACTICALC 64

- Practicalc 64(d) or (t) . . . $17.95
- Practifile $17.95
- Programmable Spreadsheet $24.95

- ★ All items new and factory sealed
- ★ Buy with confidence, we honor manufacturer's warranty
- ★ Qualified corporate and educational purchase orders accepted
- ★ We accept VISA, MasterCard, COD, and Mail Orders.

PRINTER INTERFACES

- Cardco ?/G $47.95
- Cardco G Wiz. . . . . $CALL
- Tymac Connection $67.95
- MW-350 . . . . . $CALL
- MW-350 buffer $20.00
- Grapler CD $87.95

LETTER QUALITY PRINTERS when near letter quality isn't good enough

- Riteman LQ $239
- Epson DX-10 . . . . . $229
- Epson DX-20 . . . . . $309
- Star Powertype . . . $299

NAVERONE 3-Slot Cartridge Expander . . $27.95

RGBi/Composite Monitors Alternatives to the 1902

- Technica MJ-22 . . . . . $269.00
- Panasonic 1300 . . . . . $CALL
- RGBi Cable $19.95
- Composite Video Cable . $6.95

MONITOR MADNESS

SAKATA SC100
- 13" COLOR $149.00
- Zenith 12" Amber . . . . $ 77.95
- Zenith 12" Green . . . . . $ 77.95
- NEC 12" Green . . . . . $ 69.95
- Cable for monitors . . . $ 6.95

FAST DEPENDABLE SERVICE — Your order on in stock items is shipped UPS ground the next business day. UPS 2nd day and next day air available.
"If we don't have the lowest price — give us a chance to beat it."

TUSSEY COMPUTER PRODUCTS

P.O. BOX 1006
STATE COLLEGE, PA 16804

NEW LOWER PRICES! NEW PRODUCTS! MANY PACKAGE DEALS!

MONTHLY SPECIALS

Expires 12/31/85

Indus GT	$CALL
Okimate 10	$169.00
Vizastar 8K	$ 79.95
Fleet System II	$ 42.95
Compuserve Starter Kit	$ 19.95
Amaray Mediamate 5 *or* Innovative Concepts Data Case each holds 50 disks Your Choice	$ 9.95 EACH

The Print Shop

Broderbund Print Shop . . . $25.95
Graphics Library I or II. . . . $16.95
120 sheet color paper refill
⅓ red, ⅓ blue, ⅓ gold $8.95

MIRAGE CONCEPTS

Database Manager with Report Generator $36.99
Prof. Wordprocessor. . . $36.99
Database Manager, Prof. WP Package. $67.95

NOW IN STOCK CALL FOR LATEST PRICES!

COMMODORE 128=

1571, 1572 disk drives, 1902 monitor, 1670 modem, & Software for the C128

PACKAGE DEALS AVAILABLE
ON C128 AND DISK DRIVES CALL FOR DETAILS

CLOSEOUT PRICES ON C64, 1541, and 1702 PACKAGES
MPS-801 PRINTER $106.95

MODEMS — MODEMS — MODEMS

TOTAL TELEMODEM . . . $29.95
MASTER MODEM . . . $39.95
includes Compuserve, Dow Jones time

1660	$49.95
WESTRIDGE AUTO	$59.95
MITEY MO.	$59.95
VIP TERMINAL	$29.95
VIDTEX TERMINAL	$23.95
COMPUSERVE STARTER KIT	$19.95

COMMODORE 128= SOFTWARE

WORDPRO 128 from Proline. Written by Steve Punter, author of best sellers Wordpro 3+/64, Wordpro 64. Uses 80 columns, fast drives! list $99.95 . . . . OUR PRICE $89.95

JANE	$32.95
Perfect Calc	$42.95
Perfect Writer	$CALL
Perfect Filer	$CALL
Vizastar 128	$CALL

DISKOUNT DISKS!!

Bonus Disks (10)
SS/dd . . **$9.95** dd/dd . . $12.95
Maxell (10)
ss/dd . . **$13.95** dd/dd . . $CALL
Centech colored disks (10)
ss/dd . . **$9.45** dd/dd . . . $11.95
other brands available . . . . CALL

PRO-LINE SOFTWARE

GT 4, fast load/fast save/disk basic/cartridge for C-64	$29.95
C POWER	
C COMPILER	$69.99
CADPIC	$36.95
CASHBOX	$36.95
Wordpro 64	$36.95
Spellpro 64	$32.95
Mailpro 64	$24.95
Profile 64	$36.95
PAL 64	$32.95
POWER 64	$32.95
TOOLBOX 64	$69.95

**Call for Prices on New . . .
Batteries Included products for the C128**

80 Columns from Data 20

The XL-80 is an 80 column board that plugs into the back of your C-64. It's output is a crisp 80 columns (monochrome monitor req.) snow free. Also included are an 80 column word processor, spreadsheet, and mailing list program, all at one incredible price **$79.99**

Commodore 64, 128 SOFTWARE

WORD PROCESSORS

Wordpro 64 (d)	$36.95
Wordpro 3+/64 (d)	$59.00
Fleet System II (d)	$CALL
Paperclip (d)	$47.95
Paperclip w/Spellpack (d)	$69.99
Cardco Write Now 64 (c)	$37.00
OmniWriter/Speller (d)	$39.95
Mirage Professional W.P. (d)	$36.95
Letec Font Master (d)	$24.95
Trio (d)	$64.99

DATABASES

Consultant (d)	$53.95
Mirage Database w/Rpt Gen (d)	$36.95
Superbase 64 (d)	$44.95
Practifile (d)	$12.95

SPREADSHEETS

Vizastar (d,c)	$86.95
Practicalc (d) or (t)	$12.95
Calkit	$39.95
Programmable Spreadsheet	$19.95
Calc Result Adv. (d,c)	$67.00
EZ Calc	$19.95
Cardco Calc Now 64 (d)	$31.95

BI HARDWARE

BI-80	$106.95
Buscard II	$CALL

CARDCO

Graph Now	$29.95
Numeric Keypad	$35.00
5 slot expansion CB-5	$58.00
Mail Now 64 (d)	$31.95
Spell Now (d)	$31.95

UTILITIES

CSM 1541 Align (d)	$29.95
Simon's Basic	$29.95
Canada A/M (d)	$39.95
Merlin 64 (d)	$33.95

INTEGRATED SOFTWARE

Trio (d)	$64.95
Homepak (d)	$39.99
Vizastar	$79.95

MISCELLANEOUS

Koalapad w/Painter	$64.95
Koala Printer (d)	$CALL
Kid Pro Quo (d) (d)	$27.99
Softsync Personal Acct. (d)	$32.95
FCM (d)	$19.95
Cont. Home Acct (d)	$46.95
Complete Personal Acct (d)	$54.00
64 Doctor (d)	$24.95
Timeworks Inventory, A/P, A/R, C/F, General Ledger, Payroll (d)	$40.95 ea
PC Pal Printer Stand	$19.95
1541 Express	$CALL
Fast Cable	$CALL

MORE MISC.

Epyx Fast Load	$24.95
Broderbund Print Shop (d)	$25.95
Graphics Library I (d)	$17.95

To order by mail: Send money order, certified check, personal check. Allow 2 weeks for personal check to clear.

Shipping: $2.50 for software and accessories/$10.00 for printers and color monitors/$8.00 for disk drives and other monitors/ Add $3.00 per box shipped COD. Call for other shipping charges. Additional shipping required on APO, FPO, AK, HI, and foreign orders.

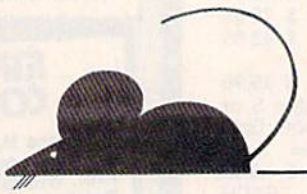
Terms: ALL PRICES REFLECT CASH DISCOUNT, ADD 3%

FOR MASTERCARD OR VISA. Manufacturer's warranty honored with copy of our invoice. **ALL SALES ARE FINAL.** Defective items replaced or repaired at our discretion. Pennsylvania residents add 6% sales tax. Prices and terms subject to change without notice.

TUSSEY COMPUTER PRODUCTS

ORDERS ONLY . . . CALL TOLL FREE
1-800-468-9044
INFORMATION & PA ORDERS 814-234-2236

Trackmouse



Warren Block

This useful programming routine lets you move the cursor anywhere on the screen using a joystick or trackball. For the Commodore 64.

With the advent of Apple's Macintosh, the mouse has become a popular input device. It provides a fast and easy way for moving the cursor anywhere on the screen. By contrast, the cursor control keys on the 64 have a rather clumsy arrangement. A more logical arrangement would be four separate keys in a diamond pattern like those found on the Plus/4 or 16. Another feature of 64 cursor control which can be improved is cursor movement. You can't move diagonally. You must first move up or down to a line, and then across to a character. One solution to both of these drawbacks is freedom of movement without cursor keys.

"Trackmouse" provides that solution, and with only 13 program lines. It gives 64 owners mouse-like control of the cursor with a joystick or trackball.

After typing in Trackmouse, save it on tape or disk, and run it. With a joystick or trackball plugged into port 2, you can now freely move the cursor around the screen. Pressing the fire button is the same as tapping the RETURN key. Pressing RUN/STOP–RESTORE turns off Trackmouse, but it can be turned on again by typing **SYS49152.**

Trackmouse is designed to be used during programming and debugging, but cannot be used while a program is running unless the program reads the cursor keys with a GET statement. For example, the following lines can be used with Trackmouse to control the movement of a spaceship:

```
10 GET A$:IF A$="{UP}" THEN move
   ship up
20 IF A$="{DOWN}" THEN move ship
   down
30 IF A$="{LEFT}" THEN move ship
   left
40 IF A$="{RIGHT}" THEN move ship
   right
```

To read the fire button, check if the RETURN key is pressed:

```
50 IF A$=CHR$(13) THEN fire missile
```

How It Works

The program POKEs in a machine language routine starting at location 49152. The routine is relocatable, however, so you can put it elsewhere in memory. Just change line 110 to set the variable S equal to the new starting address. If you do this, be sure to SYS to the new address instead of 49152 to turn Trackmouse back on after pressing RUN/STOP–RESTORE.

Trackmouse is tacked onto the ordinary keyboard interrupt routine at $EA31 so that when an interrupt is generated (every 1/60 of a second), the computer executes Trackmouse first. The program reads the joystick or trackball and interprets its movements into pseudo-keypresses which are then put into the keyboard buffer. The computer thinks that you actually pressed the cursor keys.

Since this program changes the interrupt vector at $314–315, it will not work with other programs that also use this vector.

Trackmouse

```
10 S=49152:REM STARTING ADDRES
   S                          :rem 134
20 FORA=STOS+84:READB:POKEA,B:
   C=C+B:NEXT                 :rem 58
30 IFC<>8486THENPRINT"{CLR}TYP
   ING ERROR1":STOP           :rem 34
40 POKES+7,S/256:POKES+2,S-256
   *PEEK(S+7)+13              :rem 217
50 SYSS                       :rem 183
60 DATA 120,169,13,141,20,3,16
   9,192,141,21,3             :rem 98
70 DATA 88,96,230,2,165,2,41,3
   ,208,61,173                :rem 225
80 DATA 0,220,73,255,168,41,1,
   240,2,208,28                :rem 5
90 DATA 152,41,2,240,2,208,24,
   152,41,4,240               :rem 249
100 DATA 2,208,20,152,41,8,240
    ,2,208,16,152             :rem 39
110 DATA 41,16,240,23,208,12,1
    69,145,44,169,17          :rem 210
120 DATA 44,169,157,44,169,29,
    44,169,13,160,1           :rem 177
130 DATA 132,198,141,119,2,76,
    49,234                    :rem 240
```

ABBY'S DISCOUNT SOFTWARE

ABBY'S CARRIES A FULL SELECTION OF SOFTWARE FOR YOUR COMMODORE COMPUTER. CALL FOR CURRENT PRICES.

ABBY'S CHRISTMAS STOCKING STUFFERS

ATARISOFT VIC-20 (ROM)
Pac-Man, Donkey Kong, Centipede, and Defender
All Four Titles for only **$12** — PLUS — Receive **FREE** Gortek & Michrochips

ATARISOFT C-64 & C-128 (ROM) ..... $8 Each
Robotron 2084, Defender, Dig Dug, Pac Man

ATARISOFT APPLE (Disk) ..... $7 Each
Stargate, Jungle, Defender, Pac Man, Donkey Kong, Robotron, Dig Dug, Centipede

SPINNAKER C-64 & C-128 (ROM) ..... $16 Each
Adventure Creator, Aegean Voyage, Alf in the Color Caves, Alphabet Zoo, Bubble Burst, Delta Drawing, Facemaker, Fraction Fever, Jukebox, Kids on Keys, Kindercomp, Up For Grabs

FISHER PRICE C-64 & C-128 (ROM) ..... $13 Each
Dance Fantasy, Memory Manor, Linking Logic, Logic Levels, Alpha Build, Hop Along Counting, Up & Add 'Em, Sea Speller, Number Tumbler

We Carry A Complete Line of Software. The Following Is Just a Sample of our Products

ABACUS

Ada	$33
Fortran	$39
C-Basic	$39
Ultrabasic	$27
TAS-64	$49
Basic-64	$36
Assembler-Editor	$36
Power-Plan	$49
Anatomy of the Commodore (Book)	$18
Anatomy of the Commodore (Disc)	$14
Anatomy of the 1541 (Book)	$18
Anatomy of the 1541 (Disc)	$14
Super Pascal	$48
Super C Compiler	$59

DAVIDSON & ASSOCIATES

Math Blaster!	$34
Word Attack!	$34
Spell It!	$34

MICROPROSE

F-15 Strike Eagle	$25
Kennedy Approach	$24
Decision In The Desert	$25
Crusade In Europe	$25
Acrojet	$27
Silent Service	$27
Gunship	$27

EPYX

Ballblazer	$26
Rescue on Fractulus	$26
Summer Games II	$26
Jet Combat Simulator	$26
Breakdance	$26
Winter Games	$26
The Eidolon	$26
Koronis Rift	$26
Temple of Apshai Trilogy	$26
Fast Load (R)	$26

ELECTRONIC ARTS

Music Construction Set	$17
Realm of Impossibility	$17
7 Cities of Gold	$24
Adv. Construction Kit	$28
Archon	$17
Archon II	$24
Financial Cookbook	$28
One On One	$24
Pinball Construction	$17
Murder/Zinderneuf	$17
Moviemaker	CALL
Sky Fox	$27
Reach For Stars	$39
Europe Ablaze	$39
Carriers At War	$39

INFOCOM

Deadline	$29
Enchanter	$25
Hitch Hiker's Guide to the Galaxy	$25
Infidel	$27
Sorcerer	$27
Witness	$25
Invisaclues	each $7
Wishbringer	$27
ZORK I	$25
ZORK II & III	$27

SSI

Kampfgruppe	$45
Field of Fire	$27
Operation Market Garden	$35
Computer Quarterback	$27
Battle for Normandy	$27
Broadsides	$27
Combat Leader	$27
Gemstone Warrior	$25
Wings of War	CALL
Imperium Galactum	$27
Six Gun Shootout	$27
Phantasie	$27
Computer Ambush	$44
Colonial Conquest	$44
Questron	$35

MINDSCAPE

Show Director	$29
Perfect Score: SAT	$54
Crossword Magic	$39
Keyboard Cadet	$29
Bank St. Music Writer	$39
Color Me: The Computer Coloring Kit	$24
To Use With Color Me:	
Hugga Bunch	$ 8
Rainbow Brite	$ 8
Shirt Tales	$ 8
Supply Box	$ 8
Tinka's Mazes	$19
Tinka's Adventure	$19
Tonk in the Land of Buddy-Bots	$19
Halley Project	$29

HARDWARE

1670 Modem	CALL
C-128 Computer	CALL
1571 Disk Drive	CALL
1572 Dual Drive	CALL
1902 Monitor	CALL
Printers	CALL
Toshiba 5400 VCR	$399
Toshiba 5000 VCR	$299

BRODERBUND

Karateka	$22
Print Shop	$35
Graphic Libary II	$18
Paper Refill	$16
Mask of the Sun	$28
Spelunker	$22
Stealth	$22
Serpent's Star	$28

AMIGA SOFTWARE

Winter Games	CALL
Ball Blazer	CALL
Paintcraft	CALL
Chartcraft	CALL
Videocraft	CALL
Textcraft	CALL
Musicraft	CALL
Amiga "C"	CALL
General Ledger	CALL
Accounts Receivable	CALL
Accounts Payable	CALL
Sales	CALL
Enable	CALL
Enable/Write	CALL
Enable/Calc	CALL
Enable/DB	CALL

ACCESSORIES

Print Shop Paper Refill	$16
Disk Notcher	$ 6
Ribbon Cartridge For Okimate 10	$ 6
128 K Upgrade for C-128	CALL
384 K Upgrade for C-128	CALL
Covers for All Computers & Accessories	$8 & Up
G-WIZ	$55
Datatech (Box of 10)	$10
U Print Interface	$79

DIGITAL SOLUTIONS

Paperback Writer C-128	$35
Paperback Writer C-64	$29

TOP HITS

Fleet System II	$65
Paperclip/Speller	$85
Homepak	$37
B/Graph	$29
Cave of the Word Wizards	$24
Beachhead II	$29
CSM 1541 Disk Alignment	$39
Print Shop	$31
Home Accountant	$59
Net Worth	$71
Star League Football	$25
Doodle	$29
Dow Jones	$27
Compuserve	$24
Micro League Baseball	$31
Team Disk (for above)	$16
Flight Sim. II (D or C)	$39
Mr. Nibble	$34
Mach 5	$29
VIP Terminal II	$36
Super Bowl Sunday	$24
Calkit	$39
I Am The C-64	$21
Spy vs. Spy	$21
Below The Root	$19
Swiss Family Robinson	$19
Mindwheel	$29
Spy Hunter	$34
Tapper	$34
Tsushima	$24
Saragon III	$35
Mind Prober	$22
Fontmaster	$19
Fontmaster II	CALL
Mr. Nibble MSD	$34

SOLID STATE SOFTWARE

Vizastar XL8	$89
14K of Free RAM	

TIMEWORKS

Swiftech with Sideways	CALL

ARKTRONICS - C-128

Jane Write	CALL
Jane Calc	CALL
Jane List	CALL

THORN EMI SOFTWARE C-128

Perfect Writer	CALL
Perfect Calc	CALL
Perfect Filer	CALL

CARDCO, INC.

Write Now/64	$42
Mail Now/64	$32
Spell Now/64	$32
File Now/64	$32
Paint Now/Graph Now/64	$32

ABBY'S SUPER BUY!!

EPYX SCRABBLE
$7.00

LIMITED QUANTITIES

ALL TITLES ON DISK UNLESS MARKED (R) FOR ROM CARTRIDGE

Order Line
1-800-282-0333
ORDERS ONLY! Sales Personnel Do Not Have Information on Previous Orders or Product Specs.

WE CHECK FOR STOLEN VISA & MASTERCARD
M-F 10 a.m.-7 p.m.; Sat. 10-3 ET
37 S. Broad Street, Fairborn, OH 45324

Customer Service
1-513-879-9699

AD #G-125

SOFTWARE ONLY — Prepaid orders over $50 receive free shipping via UPS in continental U.S. Please add $2 orders under $50. Hardware and all orders requiring shipment via U.S. Post Office are subject to additional freight charges. Add $5 for COD orders. VISA/MasterCard orders under $15 add $1 service charge. Ohio residents add 5.5% sales tax. Personal checks require a three-week waiting period. No waiting when paid by credit card, certified check or money order. All items subject to availability and price change. PLEASE CITE AD NUMBER WHEN ORDERING.

VISA MasterCard

The Epson HI-80 Plotter

When many Commodore owners think of a plotter, they probably visualize the small 1520 plotter that Commodore manufactured as an inexpensive (under $100) peripheral for the VIC-20 and Commodore 64. Some may be familiar with the large, blueprint-sized plotters—over $2,000—produced by Hewlett Packard or Houston Instruments, and used in industry or for scientific applications. The Epson HI-80 four-color plotter fits neither of these categories. It uses regular 8-1/2 by 11 inch or legal-sized paper, bond or transparent acrylic, and has a price tag that small business and home users can afford. Although the HI-80 has a manufacturer's list price of $599, it can often be found in stores for less than $500—no more expensive than a high quality dot-matrix printer.

The HI-80 is easily interfaced to the Commodore 64 or 128. We used a Cardco CARD? B, but a CARD? +G or comparable interface from another manufacturer should work as well. With a 64, the HI-80 can be used either from BASIC or with a word processor—we used *Easy Script*—and is addressed by using the same ASCII character string codes as an Epson MX, RX, or FX-80 printer. It has excellent quality print when used as a printer, but is, of course, very slow when compared to a state-of-the-art dot-matrix printer. We recommend using it only as a printer when it is necessary to combine text and graphics. One friend easily wrote a short program for making signs, and by first printing a grid with X and Y coordinates, was able to place pie charts and bar graphs exactly where he wanted them using HI-80 commands. Users with 64s and some programming ability should be able to make some very impressive presentations with the HI-80 plotter.

It is with the Commodore 128 in CP/M mode that the HI-80 really shines. The CP/M version of Epson's *KeyChart* software (about $30) loads right into the 128 in CP/M mode, providing 128 users with a tool to create sophisticated, full-color presentation graphics in minutes. If this isn't enough, the program provides an interface to most popular CP/M spreadsheets, and allows loading text files from most CP/M word processing programs. This means that you can create graphs from spreadsheet calculations, and mix them with text from a word processor. *Keychart* supports more chart types than there is room to list here, including multiple slice exploded pie charts and scatter plots—all types can be mixed on one sheet and combined with text.

I highly recommend the HI-80, particularly to 128 owners. With the *Keychart* software, it allows a $300 computer to perform functions that up to now were accessible only from MS-DOS or CP/M machines costing many hundreds of dollars more.

Specifications:

Speed: Plotter Mode 230mm per sec. (9.96 inches per second)

Printer Mode 165mm per sec. (6.5 characters per second)

Motion Command Rates: 15 moves per second maximum.

Maximum Plotting Area: 267mm × 192mm (10.51 inches by 7.56 inches)

Resolution (step size): 0.1mm (.0004 inches)

Positioning accuracy: 0.3mm plus 1 percent of distance moved.

Pen Types: ballpoint (water-based ink) and fiber tip (water-based and oil-based inks); proprietary pens in holder clip.

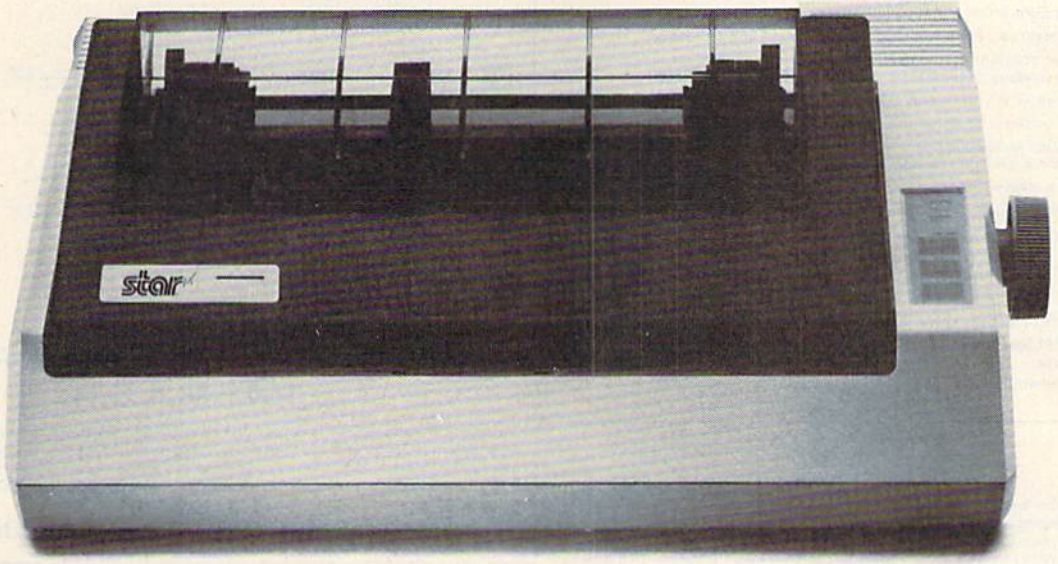
Pen Colors: plotter uses four at once; software will prompt user to change pens if desired. Ten colors available. Black, red, blue, and green fiber tip supplied with plotter.

Options: Hewlett Packard-Emulation Board, allowing use of large library of software designed for H-P 7470A plotter, mostly in MS-DOS and CP/M. Epson *Keychart* software in CP/M or MS-DOS, allows user to create plots and charts either from raw data or with files from *SuperCalc*, *Lotus Symphony* and *1-2-3*, *Multiplan*, *Wordstar*, and many others.

Interface: Centronics Parallel standard.

Plotter Controls: Mode 0—Epson proprietary mode, (ASCII text driven),

A BRIGHT NEW STAR FOR A COMMODORE TO PRINT BY



Now you can own a sophisticated, affordable printer that's made just for your C-64.™

Here's a dual-mode Star printer that delivers 120 cps draft and 30 cps *near-letter-quality.* With outstanding graphics ability. Interface cable. And friction and tractor feed. All standard.

And it's the best-selling printer for the best-selling home computer!

Star's made-for-Commodore® printer needs no add-ons. Just plug it into your computer and go to work. It's made at a price that can't be beat.

You've got the computer. Now get everything out of it. Get the Star that's labelled "C." There's no better mate made for a Commodore.

Star® MICRONICS

Commodore and C-64 are trademarks of Commodore Business Machines, Inc. and/or Commodore Electronics Ltd.

CUSTOM ROM $19.95

NOW YOU CAN HAVE YOUR COMPUTER POWER UP MESSAGE SAY ANYTHING YOU WANT. IN ANY COLOR YOU WANT.

- Color of Cursor
- Color Of Screen
- Color Of Border
- Choose Up To 31 Letters As Your **Power Up** Message

Also included is the 2 Key Load. Pressing the Shift/Run Stop will load "*", 8, 1.

You can choose from any of these colors: Black, White, Red, Light Red, Cyan, Purple, Green, Light Green, Blue, Light Blue, Yellow, Orange, Brown, Dark Grey, Medium Grey, Light Grey.

P.S. . . . It sure is nice having your own colors and message on the screen on power up!

MASTER LOCK

Here, at last, is a program that will protect your software programs from unauthorized duplicating. 1 to 1 million copies can be protected, fast and easy.

- Specially designed for the C-64 and 1541 Disk Drive.
- Completely encrypts and protects your programs.
- Fully compatible with almost all machine language and basic programs — can even support chained programs.
- Contains a special feature which protects your program from being 'broken.'
- Incorporates all the latest techniques in program encryption and protection.
- Each system has been specially prepared and is unique from all other systems — only **you** are able to make working duplicates of your own protected programs.
- Simple and easy to use — entirely menu drive with prompts.
- Will stop virtually all software copiers from duplicating your programs.
- Fast and reliable protection routine does not take away any useable space from your disk — all 664 blocks are available for use.
- Easy to follow step by step instructions are included on the disk.
- A **must** for all programmers who do not want their programs to be in public domain!

Even the "nibblers" can't copy them. Not even *Disk Maker, *Mister Nibbles, *Copy II, *Ultra Byte or *Fast Hackem. The time to protect you disk is only 5 (five) seconds and each Master Lock makes a different protection scheme. Only.

$29.95

*Disk Maker™, Basix
*Mister Nibbles™, Full Circle
*Copy II™, Central Point Software
*Ultra Byte™, Ultra Byte
*Fast Hackem™, Basement Boys Software

TOOL BOX

This disk has over 100 routines, some of them are routines for protection, smooth scrolling, modem routines, and sound and color routines; bootmaker, paddle and joystick; read terminal, auto dial, auto answer. They can easily be incorporated into all of your programs. It is also fully documented. With this disk alone you could build your own program. This disk has a lot of tricks that are used in commercial software.

$19.95

SWIFTERM AND MODEM

This is the best package anywhere!

SWIFTERM:
is absolutely the easiest terminal program available anywhere.

- Works with the 1660, and Westridge Modem
- New printer and midwestern protocal
- Printer dump
- DOS commands access from menu
- Phone book
- Auto dial (with auto redial)
- 29K storage buffer
- Save to disk
- Standard ASCII up/down loading
- 300/1200 Baud

This is an excellent easy to use program for a very reasonable price.

THE MODEM:
Auto dial, auto answer, 300 Baud modem that is 100% compatible with Commadors 1650 modem, so all our software will run with it.

ALL THIS FOR ONLY $35.96

So why buy just another terminal program when you can get a modem, too!?!

300/1200 BAUD

Modem for the C-64
With SWIFTERM $169.00

GRAPHIC LABEL MAKER

Give your labels the professional touch. With Hi Rez Graphics make your own design or use one our 60 premade labels with easy to use on screen editor. You can insert up to three lines of text then choose the picture you want to put on the left hand side of the label. Then you can print out as many labels as you want. This has got to be the neatest label program out there and it's only **$24.95**

*Also available — the x-rated Graphic package for the 64 and your print shop. There's 60 Hi Rex pictures.

$24.95

1541 M.A.S.H.

Now you can service your own 1541 disk drive using 1541 M.A.S.H. Save big bucks on repair bills. Rate the performance of your drive. Test and adjust RPM's. Test and adjust head alignment. Step by step instructions that anyone can follow. Pays for itself the first time you use it to adjust a misbehaving drive. No knowledge of electronics is necessary. All you needs is a screwdriver and 20 minutes.

NOW ONLY $19.95

DISK TRACKER

Now you can log all of your disks into a neat filing system. Automatically record disk names and program titles. Allows you to quickly scan what you've got. Sorts titles; prints jacket covers; store up to 1600 disk directories on one disk. Search quickly through your entire disk collection for a misplaced program. Works with one drive or two. Fast, easy operation. This program is a must for everyone!

ONLY $19.95

THE XXXXXXXXXX

X-RATED GRAPHICS LIBRARY

Your Print Show May Never Be The Same!

X-Rated Graphics guaranteed to spice up your special letterheads, greeting cards, signs and banners! Everything from mild to Look Out Nelly! 60 Erotic additions to heat up your print shop graphics library, plus 5 ribald Screen Magic additions!

$24.95

Print Shop is a trademark of Broderbund.

GRAPHICS & GAME DISK

X-Rated adventure like you have never seen before. Complete with graphic simulations.

Plus: X-Rated Cartoons

$24.95

HAVE WE GOT A MESSAGE . . . FOR YOU!

Message . . . is a unique graphics integration package which allows you to continuously display hiresolution and multicolor files. Up to 12 files* may be stored in memory and displayed from 1 to 59 seconds each.

Message . . . can use Print Shop 'Screen Magic' files, Flexidraw files, Doodle!, Koala Painter, and more! **Message** . . . even comes with a 'Screen Maker' program to create your own message files!

Use **Message** . . . for advertising displays, titles for home videos, art shows, etc. . . . **Message** . . . even plays background music to accompany displays and you can create your own music files with the 'Music Maker' program.

Also included are 'Graphic Aids' utilities for conversion of different file types, including conversion of Koala Painter files to Doodle! or Print Shop!

The price for all this? Just $19.95 including shipping and handling

*Actual number of files dependent on file complexity.

MAGNUM LOAD

Programed by Jim Drew

MAGNUM LOAD is a new replacement KERNAL (operating system) ROM chip for your Commodor 65 or 128 computer that will load and verify programs up to 6 times faster than before. The tape routines have been removed from the old chip and in their place have been put a high-speed loader, high-speed verify, and disk driver no-head-rattle routine. Unlike the older cartridge fast loaders, no ports are tied up at the rear of the computer, the screen is not blanked during loading and there is no wear-and-tear on the expansion port. For maximum convenience and performance, the chip is installed directly in the circuit board. Generally a socket has already been provided to make the operation easy, but occasionally some soldering may be required. Now you can give your 1541 disk drive "1571 speed."

Rather than give you more exagerated claims about how many times faster our ROM chip is compared to the slower cartridge versions, a comparison chart is supplied listing MEASURED loading times.

Program	Star-Dos	Reg. Load	Mach 5	Fast Load	MAGNUM LOAD
Pitstop II	?	144 sec.	43 sec.	41 sec.	**31 sec.**
Music Shop	?	105 sec.	105 sec.*	105*	**21 sec.**
Hitchhiker's Guide to the Galaxy	?	70 sec.	70 sec.*	N.G.**	**68 sec.**
On-field Football	?	149 sec.	66 sec.	63 sec.	**56 sec.**
EASY FINANCE I	?	58 sec.	13 sec.	13 sec.	**11 sec.**

$24.95 For 1541 or MSD Version

$39.95 for Combo Version

*Will not fast load - defaulted back to regular load

**Failed to load at all

D-CODER

- Translates any machine language program into easy-to-ready English descriptions with complete explanations of each command.
- Makes complete notations of all important memory locations accessed by the program (SID, VIC, MOS, KERNAL, etc.)
- Gives you three ways of accessing programs:
  1. **Will read and list programs from DISK**
  2. **Will read and list programs from MEMORY**
  3. **Direct user input (from magazines, etc.)**
- Can be used to locate and examine any machine language program's protection routines!
- Can be used to easily break apart machine language programs for study and examination!
- Printer option for complete hard copy listings!

You no longer need to be an EGGHEAD to read Machine Language.

$19.95

N-CODER

THE PERFECT COMPANION PROGRAM TO D-CODER!

Allows you to easily make changes in machine language programs . . . right on the disk!

- Rewrite ability allows code to be altered and then rewritten directly to the disk!
- Features sector-by-sector scrolling assembly language display of machine language programs!
- Notation of ASCII text equivalents for easy spotting of embedded text strings!
- Handy reference display of all assembly language commands and their ML numerical equivalents!
- Byte splitter for easy splitting of decimal addresses into low byte-high byte format!

$19.95

SOFTWARE PROTECTION HANDBOOK Third Edition! Now Available!

If you're **tired** of being harassed by **protected software** and too many **copy** programs, then this is the book for you! This 224 page manual covers the gamut from legalities to protection methods to step-by-step back up procedures. Now you can learn both how to **protect and unprotect** software! The techniques covered include copying cartridges to tape or disk, tape protection, and disk protection. Disk protection covers error numbers 20, 21, 22, 23, 27 and 29 **plus** single track formatting, header modification, header swapping, half track reading and writing, reading and modified bit densities, formatting illegal track/sectors, sync writing and **more!** The Third edition **explains**, tells how to **detect** and how to **write** them with included software.

C-64 Book Only ..... **$19.95** US

Book & Disk of all Programs ..... **$29.96** US

This manual does not condone piracy

*Shipping: $2.00

'TRACK TRAP' The 1541 Disk Expander!

• Supplement to the Software Protection Handbook •

The most unusual and innovative protection analysis tool for the Commodore yet! — **Not For Beginners** — This system expands your 1541 drive giving capability otherwise only possible for **professional** disk duplication equipment. Now you can create or analyze exotic forms of disk protection. **'D.O.S. Kings' Take Note!'** — Entire tracks of data can be read and written without regard to 'standard' sync and format. You are not longer limited to sector by sector searches. Whole track readouts reveal hidden data even when all or most of the sectors have been erased. Uncovers and writes data under errors, pulse coded sync or data, hidden data and access codes, multiple track densities and more! This supplemental manual covers the complete implementation of the track trap system including necessary software and hardware documentation.

Track Trap disk expanded manual ..... **$9.95** US

Top Secret Stuff I and Top Secret Stuff II

Programed by Jim Drew

Are both collections of 20 programs per diskette (that works out to about $1.00 per program!) that help you explore and enhance your Commodore 64 and/or 128 and 1541 disk drive. Now you can unlock many secrets formerly known only to top machine language programmers by using these sophisticated "tools." If you have ever been curious about the inner workings of your computer system, now is your chance to dig in and find answers with the help of these programs. These collections of programs have gotten rave reviews from actual users, and we are sure that you, too, will be pleased.

The programs include on each diskette are listed below

TOP SECRET STUFF I

The Dock (view/repair disk contents)
Sync Checker (diskette)
Imbedded Track Number Creator
Disk Manipulation System
3 Minute Copy (backup program)
Diskette Matcher (compare sectors)
Unscratch A File (recover file)
View BAM (block allocation map)
1541 Read/Write Test
½ Track Reader
Header Reader (display disk header)
Sync Maker
Device Number Change (disk drive)
Electronic Arts Backup
Drive Mon (disk drive m/l monitor)
Diskette File Log (start-end address)
Write-Protect Sensor Test
Repair A Track (recover data)
Fast Format (10 seconds)
½ Track Formatter

$19.95

TOP SECRET STUFF II

RAM Test (test Computer RAM)
Copy $AOOO-$FFFF (under ROMS)
Display G.C.R. (All sector data)
Un-Write Protect (diskette)
Unnew Program
Wedge - $8000
Smooth Scroll (messages up screen)
Koala Dump (koala pad screen dump)
Disk Manipulation System
Disk Eraser (20 second clean wipe)
Split Screen (TWO screen colors)
Disk Protection System (stops copies)
Write Protect (diskette)
Boot Maker (autobook BASIC programs)
Wedge - $COOO
Diskmatcher II (high speed version)
No Drive Rattle (on reading errors)
3 Times Disk Drive Head Speed
Monitor Test (check video monitor)

$19.95

WAR GAMES AUTODIALER

1. **Auto Dial** will automatically dial a set of numbers you choose.
2. **Review Numbers** will review numbers that were answered by a computer.
3. **Save Numbers** will save numbers where a computer answered.
4. **Hardcopy of Numbers** will print out list of numbers where a computer answered.
5. **LOAD Numbers** will load in numbers to continue where it left off.
6. **Continue** will pick up dialing where it was interrupted.

$29.95

BBS

- 300/1200 Band
- Remote access for sysop
- 2 levels of security for up and down load
- 7 rooms (read and write) with 4 security levels
- Secret highest level
- Open chalk board
- Auto message cycling
- Printer option

Plus the only BBS with all three (3) proticals X modem, new printer and midwest term, so anyone can up/down load.

Don't be fooled by cheap imitations. This is the most comprehensive system available anywhere. Now at a new low price.

$39.95

Enclose Cashiers Check, Money Order or Personal Check. Allow 14 days for delivery. 2 to 7 days for phone orders. Canada orders must be in U.S. Dollars. VISA — MASTER CARD — C.O.D.

Programs for C-64 $2.00 S & H on all orders

Software Submissions Invited

VISA

MasterCard

MegaSoft Limited

P.O. Box 1080, Battle Ground, Washington 98604

Phone 800-541-1541 • BBS 687-5205 After Hours Computer to Computer (BBS)

NOT COPY PROTECTED! BASICALLY BETTER!

FASTER? EASIER? MORE POWERFUL?

"If languages interest you, this one is well worth a look... It's inexpensive to try. You may find that it's just what you have been looking for."
- Jim Butterfield, COMPUTE!

"I can recommend a ***better, faster,*** and cheaper programming language. It's a flashy little European import called ***COMAL***... the most user-friendly language around."
- Mark Brown, INFO 64

"...overall ***COMAL*** averages out to about three times faster than BASIC."
- Loren Wright, MICRO

"combines some of the best features of languages like Logo, Modula, Pascal, and Ada in an easy-to-use format"
- AHOY!

"***COMAL*** was just what I was looking for."
- Colin Thompson, RUN

Where else do you get all this...
The complete **COMAL 0.14 System** for Commodore 64™ includes the **Tutorial Disk*** *(teaches you the fundamentals of COMAL)*, plus the **Auto-Run DEMO Disk*** *(demonstrates 26 COMAL programs including games, graphics, sprites and sounds)*, all for just **$7.00.**

You can add the reference book, *COMAL from A to Z*, for just **$4.00 more.**

$7 or **$11** -- either way you're a winner!

COMAL STARTERS KIT
as rated by The Book of Commodores 64 Software 1985.

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	A	*Value for Money*

Published by Arrays, Inc., The Book Division

If you want only the best, get the ***COMAL*** Cartridge Pak.
Includes: 64K ***COMAL*** Cartridge, 2 books, and 5 demo disks*
Over $140.00 value - ***now only $89.95*** plus $4.00 shipping.

For more information or to place an order call ***(608) 222-4432.***
Visa or Master Card accepted.

All orders prepaid - no C.O.D.

Send check or money order in U.S. dollars to:

COMAL USERS GROUP, U.S.A., LIMITED
6041 Monona Drive, #104, Madison, WI 53716
phone: (608) 222-4432

*Shipments may include 2 disks of programs on 1 double sided diskette.
Commodore 64 is a trademark of Commodore Electronics.

with single commands for marked vertex, polylines, circles, points joined with cubic spline curves ("French curve" line drawing), crosshatched boxes and pie chart segments, and text with continuously variable size and orientation.

Mode 1: emulates Western Graphtec MP-1000 (Wantanabe Instruments MyPlot II)

Mode 2: printer mode emulates Epson RX-80 printer, including 10 international character subsets (and four bit image modes). All modes include standard 96 ASCII printing character set plus graphics and international character subsets.

—Betsy Byrne

Epson America, Inc.
Computer Products Division
2780 Lomita Blvd.
Torrance, CA 90505
$599

Calc Now!

Cardco's approach to software might be summed up like this: Make it easy to use for the beginner, add advanced features to give it substantial power, then sell it at a reasonable price. *Calc Now!* is a fine spreadsheet, a product of this philosophy. Like most of Cardco's offerings it is "user friendly" and bug-free. It has substantial power for home and many small business applications, and it represents solid value. Its strongest point is its intuitive quality: How you think it *might* work, it *does*.

User accessibility is aided by help screens for the special function keys and by a simple keyboard overlay, similar to those found in other Cardco products. Speed of data handling/access is increased by the incorporation of a fast-load routine. (Access *Calc Now!* with **LOAD"*",8:RUN**. With this method, which uses a fast-load procedure, the program is up in less than 30 seconds, whereas the method outlined in the manual takes a minute and ten seconds.)

Grid range is more than adequate (64 × 254), and data memory is a hefty 39K. A broad selection of built-in math (15) and range (9) functions are available to the advanced user, as are a variety of data and grid formats (all of which—along with cursor position—are saved with the grid). There is a

handy cell-protection feature for business-oriented applications, and a calculator mode which allows change of cell value via formulas (example: "multiply this cell by 4 and add the value in A3").

A graph option for numeric values (represented by asterisks) is among the data formats; and basic disk functions—directory, initialize, delete, rename—are accessible from within *Calc Now!*. Relocatable loading is a useful feature, particularly for reclaiming partially corrupt data that cannot be accessed through a normal load. Titling options are flexible; and columns can be easily inserted or deleted and their widths varied individually or as a group. Dual windowing, with either horizontal or vertical split, may be cursor-synchronized or independent.

Three capabilities are particularly noteworthy: First is the alpha or numeric sorting of rows on a given column, either *all* rows or a selected *range* (no sorting occurs if one of the extremes extends beyond the range of data). This feature makes *Calc Now!* useful for simple database applications.

Second is the valuable IF-THEN-ELSE conditional logic, which gives the program a degree of "intelligence." Last is the repeat/copy option, a sure timesaver when the same data must be placed in many cells. The information to be copied may be a *range* of rows or columns, as may its destination. (Note, however, that this refers to a range of rows *or* columns, not a *block* of rows/columns. A distinction is not clearly made in the documentation, though it might be deduced from the tutorial.)

Calc Now! outputs files to disk or printer in a variety of formats, including two for use with Cardco's *Write Now!* word processor (one is designed for *Write Now!*'s mail merge feature). The disk versions are program (text) files which may not work with other word processors (Cardco does not claim they do).

Documentation is mainstream Cardco—thorough, and a bit folksy. Everything is there, in reference form, though it is often somewhat difficult to find. A most notable addition, however, is the *extensive* tutorial section—66 pages—which takes the first-time user step by step in several lessons through a typical small-business application. Two rudimentary templates—Checkbook and Budget—are included on disk, but have nothing to do with the tutorial and are not mentioned elsewhere in the manual.

Cardco continues to be interested in its customers, providing a technical support telephone number (not toll-free). In summary, *Calc Now!* is an excellent spreadsheet from a solid, customer-oriented software company.

—Art Hunkins

Cardco, Inc.
300 S. Topeka
Wichita, KS 67202
$39.95 (disk)

Commodore SERVICE

★ Normally 48 Hour Turn-Around.
★ C64 Repair $40.00
★ 1541 Alignment 25.00
★ 1541 Repair 40.00

Parts Included
(Power Supply Extra)

To save C.O.D. charges – send unit and power supply with check or M.O. to:

DIGITAL SOLUTIONS INC.
1122 - 9th St.
Altoona, PA 16601
(814) 944-0405

SATISFACTION GUARANTEED OR MONEY BACK

1985 TAX RETURN HELPER

Fast and easy income tax preparation

- This is the 5th annual edition - thousands of repeat customers
- Includes Form 1040, Schedules A, B, C, D, E, G, SE, W, Forms 2106, 2441 and 4562
- Enter and modify data on a screen copy of the form.
- Works like a spreadsheet - all the lines affected by a change are instantly updated.
- Automatic tax computation.
- Data can be saved on disk and updated.
- Also included:

TAX DBASE

A data base program to create and maintain files of tax related items (medical, car expenses, etc.) that can be used directly by the tax programs.

- Can be used all year round. Also good for many other accounting jobs (checkbook balancing, etc.)

Price is **tax deductible. C64 disk: $33 (+ $1.50 S&H)**

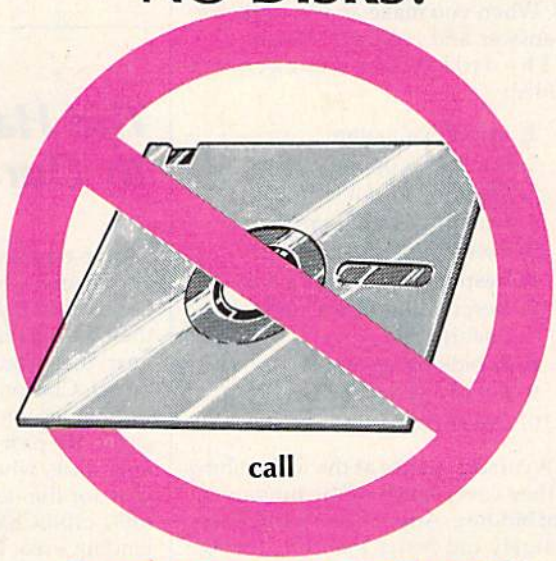
PROFESSIONAL VERSION - also prints data on IRS forms: $45 (+ $1.50 S&H)

Previous customers prices: $22 and $30 for pro-version (+ $1.50 S&H)

KSOFT CO.
845 WELLNER RD.
NAPERVILLE, IL 60540
(312) 961-1250

Dealer inquiries welcome.

WE AIN'T AFRAID OF NO DISKS!



call

DISKBUSTERS™
(805) 569-1644
OPERATOR 11
The Ultimate Disk Copy Program for C-64 & C-128

Charles Goren: Learning Bridge Made Easy

Contract Bridge was first played around 1925. It has a distinguished pedigree: a refinement of Auction Bridge, which in turn grew out of Bridge/Whist. A few rule changes made a more interesting game and assured the success of "Contract." Today, there are more than 200,000 members in the American Contract Bridge League.

Some people take this card game very seriously, as I did when I first began playing in graduate school. At that time, I read several books and played almost daily with excellent players. Now I am lucky if I average one session a month, and the caliber of my play has deteriorated. Furthermore, I haven't kept up with the latest theories and conventions. In short, I've become an average player.

The average bridge player is not very skillful, and errors due to poor knowledge of the fundamentals detract from the enjoyment of the game. What can help is the software reviewed here, subtitled: "A complete, self-paced program for learning the fundamentals of Standard American Contract Bridge bidding and play."

This program for the Commodore 64 is both a quiz and tutorial on contract bridge. You're given the choice of ten quizzes on bidding or selecting any one of 100 hands to play. The quizzes are coordinated with a slim manual. Each quiz has a "help" option and a vast number of randomly selected exercises. When you make an error, the correct answer and logic are shown.

The following quizzes are included:

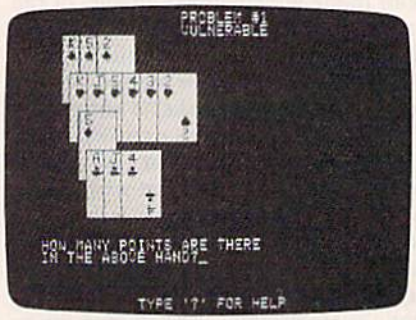
1. Hand evaluation
2. No trump opening bids
3. Opening 1 of a suit
4. Opening strong hands
5. Preemptive opening bids
6. Responding to 1 of a suit
7. Responding to a 1 no trump opening bid
8. Rebids by opener
9. Rebids by responder
10. Direct competitive auctions

A cursory glance at the topics show that they cover much of the fundamentals of bidding. Anyone mastering these will surely bid better than the average player. And reaching the correct contract is a major objective of the game.

I found the quizzes generally very helpful. The player's manual is good but very brief. It, and the program, will be of most help to people with some knowledge of the game. Even so, it may be a good idea to have close at hand one of Goren's more comprehensive books in order to bone up on esoteric rules and exceptions. I found it irritating to be confronted with an unamplified statement that I had not seen on either the "help" screen or in the manual, with no further reference on the subject. With a larger text at hand, the rationale behind a rule like, "No preempts with a 4 card major suit," could probably be clarified.

The eleventh quiz choice allows you to play 100 practice hands which are annotated in the player's manual. This is by far the best feature of the software. The hands are straightforward at first, employing standard unopposed bidding to game. Towards the end, more advanced plays, like defensive signals and endplays, are covered. In my experience, the only signal most people recognize is a kick under the table. The average player will profit from the experience of bidding and playing under conditions where errors and omissions are analyzed.

Two good points about the play section are worth singling out. I particularly admire the screen representation of the bridge table and the clever way the discards (book and overtricks) are shown. Also, if the remainder of a played hand is a lay-down, the program properly asks if you want to play it out. There is nothing more boring than being forced to play out every card when you could claim a rest.



One negative point here deserves mention. If two lines of play are equally good, the program may allow only one. For example, at the end of one hand, only a few cards were left, and it didn't matter which one I discarded. However, the program insisted on its way for no apparent reason. This might be a source of confusion to beginners.

My ability to play bridge was frozen in time when I learned it years ago: Retraining was called for. Working with this program, I picked up a few tricks (pun intended). I can recommend it to beginners who want an easy way to learn and practice the fundamentals of bidding and play, and for intermediate players who need review.

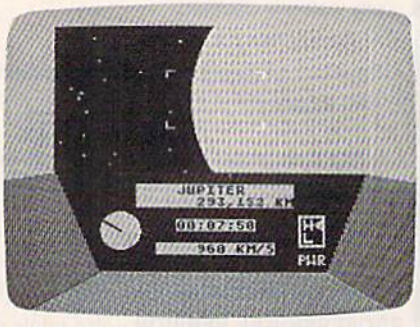
—Harvey B. Herman

CBS Software
One Fawcett Place
Greenwich, CT 06836
$79.95 (disk)

The Halley Project: A Mission In Our Solar System

You've traveled more than four billion kilometers across the solar system at faster-than-light speed, heading toward the constellation Virgo. You should be near the orbit of Pluto, and its large moon, Charon, which is your objective on this leg of the mission. Then it's a quick trip past the Sun to arrive back at your base, where you can rest and prepare for the next mission. But first, you must orbit Charon and find that elusive landing area. Much easier than on the mission to Diemos, the smallest moon of Mars. Diemos is only about ten kilometers in diameter, and orbiting it in a Mark Five Hyperjump Trainer is no easy task.

There's Charon, only 100,000 kilometers away and closing fast. Better start braking now and prepare to engage the Automatic Landing System.



This is *The Halley Project: A Mission In Our Solar System*, a package for the Commodore 64 from Mindscape which manages to be both entertaining and educational. Tom Snyder, the author of *Snooper Troops*, and other best-selling educational games for children, has collaborated with Omar Khudari on this challenging puzzle. You won't be

SMASH HITS!

A PICK OF RECENT MONTHS BESTSELLERS FROM ABACUS

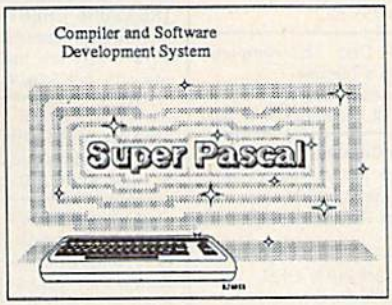
for Commodore 128 and 64

SUPER C

Complete K&R compiler and development system. With editor, compiler, linker, I/O library and extensive 200 page handbook. Creates fast 6510 machine code. $79.95

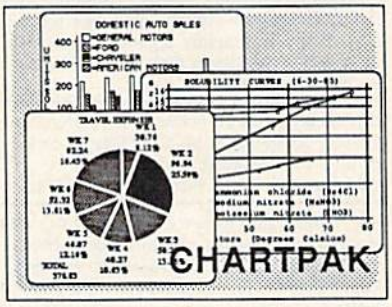
SUPER Pascal

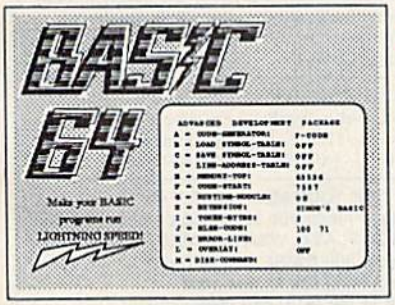
Complete J&W development system. With enhanced editor, compiler, assembler, toolkit, graphics, fast DOS (3X faster than 1541), 220 page handbook, more. $59.95



CHARTPAK

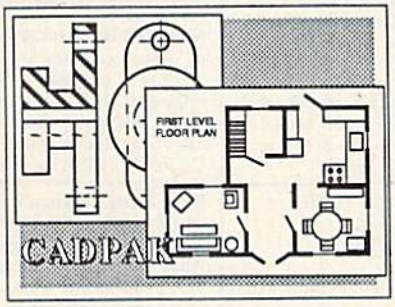
Makes professional quality pie, bar and line charts and graphics from your data. Includes statistical functions. A long time bestseller. Hardcopy to most printers. $39.95





BASIC Compiler

Versatile compiler instantly turns BASIC into lightning fast 6510 machine code and/or compact speedcode. Variable passing overlays, integer arithmetic, more. $39.95

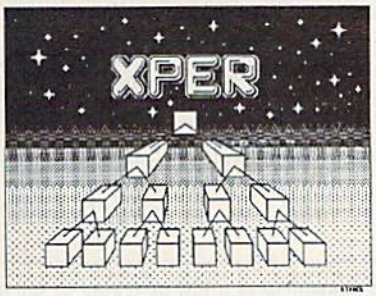


CADPAK ENHANCED

Graphics design and drawing package. Use w or w/o lightpen to create very detailed designs with dimensioning, scaling, text, rotation, hardcopy and more. $39.95

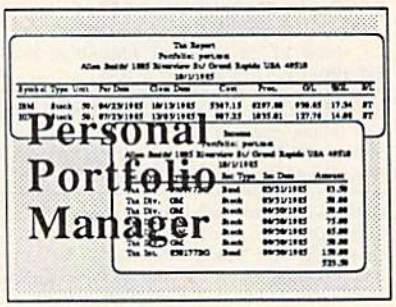
XPER

Capture your information on XPER's *knowledge base* and let this first expert system for Commodore computers help you make decisions. Full editing and reporting. $59.95



Personal Portfolio Manager

Easily manage your stocks, bonds, etc. Update portfolio manually or automatically through Dow Jones or Warner Computer. Complete reporting. $39.95



Call **now** for the name of your nearest dealer. To order by credit card call **616/241-5510**. Other software and books also available - ask for **free** catalog. Add $4.00 for shipping per order. Foreign orders add $12.00 per item. Dealer inquires welcome - more than 1200 dealers nationwide.

YOU CAN COUNT ON

Abacus Software

P.O. Box 7211 Grand Rapids, MI 49510

For Fast Service Phone (616) 241-5510

Classified

SOFTWARE

/SPEEDPAK/C64 SpeedScript 3.0/3.1 enhancer, lets you edit two files on alternate screens. Adds mail merge; eight 31 chr. macros; file encryption (32 chr. code); help screen/ Character set installer; Dvorak keyboard option. Disk only. Send check/M.O. for $15 ($12 + 3 s/h) to: /SPEEDPAK/, P.O. Box 22022, Greensboro, NC 27420

HEBREW, RUSSIAN, GREEK, KOREAN word processors for Commodore 64/128. Also create your own character sets! All for $29.95. Send check to ISRACOMP, P.O. Box 1091, K. of Prussia, PA 19406

C64/C128 owners manage your US Savings Bonds with our software. Disk & documentation included. Send $14.95 to: BONDS, P.O. Box 154, Woodbridge, VA 22194

THOUGHTFORM—outline processor for the C-64. Easily and rapidly organize notes, facts, ideas. $35.00 to Steven Gollery, 45828 Emerson St., Hemet, CA 92344

BRIDGEBRAIN: Full-featured, user-friendly contract bridge for C-64. $30 (T or D) or $1 for info. to: George H. Bodner, PhD, 1134 Harvard Circle, Pittsburgh, PA 15212

Free membership in SW club. Top British C64 progs. Member's discount. Introduct. offer: membership, catalog & reviews (no strings.) Arrow Express, Bx 660-G12, Northpt, WA 99157-0660

100% ML Disk Cataloger loaded w/options i.e. record commenting & auto-updating. Menu-driven. 10 day m.b. guar. $15. R. Biancosina, 38 S. Ogle Ave., Wilmington, DE 19805

The Checking Account Assistant $30 to $40 retail value! Complete prgm available on trial basis. For copy send blank disk + $3 p/h - Software, P.O. Box 491-K, Whitehouse, TX 75791

TIM, The Investment Manager and COMEX gold and silver management. Fun-Anl stock analysis program for 64. All three $19.95 or write for free details to: Author's Club Software, 6027 S. High, Suite 410, Oklahoma City, OK 73149

COMPLETE C64 DISK MANAGER. Create, sort, edit, print all your disk programs at ML speed. $17.50 p.p. WESTAMERICA, 1470 SW 19th Ct., Gresham, OR 97930

COMMODORE: TRY BEFORE YOU BUY. Top 25 best-selling games + classics, new releases. Visa, Mastercard. Free brochure. Rent-A-Disc, 908 9th Ave., Huntington, WV 25701 (304) 522-1665

GOMUKO - Compiled basic program, 15×15 board, Unmove, load/save game user changable logic: $14.95. Star traders for 2 to 5 players. Show off your 64 when guests come over: $14.95. Send check or m.o. to: Author's Club Software, 6027 S. High, Suite 410, Oklahoma City, OK 73149

C64 TEACHER'S AID: Gradebook, TestMaster & Conversions. By & for teachers. Menu and/or inst incl. $19.95 incl. p. Thompson Electronics, P.O. Box 1609, Borger, TX 79007

ARB BULLETIN BOARD FOR THE 64 & 128 Uses Punter & Xmodem Protocols, 27 Msg. Catagories, Dating Board & More! $61.95 (BBS) 718-645-1979 • (Voice) 718-336-2343 L & S Computers, P.O. Box 392, Bklyn, NY 11229

FREE SOFTWARE CATALOG! Call Toll-Free 1-800-554-1162, Tevex, Inc. Save ⅓ off retail prices. We carry SSI, Elect. Arts, Infocom, and many more!

The Electronic Vocabulary Tutor lets you create and study lists of English, French, German and Spanish vocabulary words. Features include foreign language characters, different study formats, color, ML and ease-of-use. For more information, write to SAA, 803 Lincoln St., Rockville, MD 20850

PERSONAL ASTROLOGY + MATE COMPATIBILITY—C64/128. Makes a great adult party game. Enter 2 birthdays; prints a professional horoscope. 8 page provocative, insightful personal compatibility profile. Includes Astrodeck! ($13 bonus) Reveals future. This is a program you'll use! Great fun. You'll love it! Only $34.95 Visa/MC, L&S, POB 935, New Paltz, NY 12561 (914) 255-5521

THE RUNNER'S LOG—C64 Disk. This complete log calculates, sums & prints a lifetime of individualized running entries. $21.45. B&B Software, P.O. Box 10212, Eugene, OR 97440

Free Educational Software Catalog 158pp, color pictures, 1000+ programs for Com., Apple, IBM, Atari. Send name & address to: Interstate Software, P.O. Box 8952, Boise, ID 83707, (208) 342-3347

COMPUTER SOFTWARE! 35%–40% OFF! Send phone number, specify software. We will call with quote. Next day shipping! C&D Assoc., Box 851, Mt. Prospect, IL 60056

NEW C64 GRAPHICS for PRINTSHOP™ USE. 80 unique graphics + 12 hi-res screens for viewing or printing by Screen Magic or get 4 original pinball games on disk $14.95/disk (A res. + 90¢ tax) + $2 p.h./order. To: On-the-Spot Graphics, Box 4802, Dept. A, Los Angeles, CA 90051. SASE for info. only.

Bible Study program for the C64. Complete with on-line scripture text for KJV, RSV, NASV, NIV, TLB. Continuous background music available while participating. Expandable. Disk only. $19.95. Risen Software, 1528-H Spartan Village, East Lansing, MI 48823

COMMODORE: TRY BEFORE YOU BUY. Top 25 best-selling games + classics, new releases. Visa, MasterCard. Free brochure. Rent-A-Disk, 908 9th Ave., Huntington, WV 25701 (304) 522-1665

For a limited time CASINO ROYALE (blackjack, poker, slots, craps, roulette) is offered to C64 users for only $19.95 + $1 sh. Send to: Lake Country Software, POB 2556, White City, OR 97503

**** UNBELIEVABLE OFFER-C64/128 **** BASIC source code given with powerful EASY-TO-USE word processor. Learn coding secrets of the pros. 2+ yrs. developing. Full documentation. Quality educational tool/word processor in 1. Quick delivery. Questions (203) 721-7963. Check, M.O. $25. PWORD, 29 Basswood Ct., Rocky Hill, CT 06067

Free Spirit Software for the C64:
POSTMASTER - Simple, efficient, mailing list program. Disk: $19.95
BASICally SIMPLE - A quick, easy method to learn Basic programming. Disk: $20
TECHNIQUE - Learn to program graphics, animation, sound, music easily. Disk: $29.95
ITALY - Travel and educational game. Disk: $15
Order from: Free Spirit Software, Inc. 5836 S. Mozart, Chicago, IL 60629

MISCELLANEOUS

TREASURE CHEST 64! National Buy/Sell monthly for Commodore users. 6 issues/$4, 12/$7. Very low bulk rates to users groups. Low cost ads. Box 17819, Salt Lake City, UT 84117

AUTHOR'S CLUB - We get you published! Send for free details or send $25.00 (a 50% savings) to: AUTHOR'S CLUB, 6027 S. High, Suite 410, Oklahoma City, OK 73149

Start saving money. 100% increase in disk capacity. Electronic methods, no holes! Manual $25, Automatic $45. Betterway, P.O. Box 17306 Kansas City, MO 64130

Technician exposes shop secrets on 1541. Includes alignment disk $20. MSD single to dual drive modification instructions $20. Quality without the price. PROGRAMEASE, Box 135, Hiawatha, KS 66434

I/O, A/D, WIRE WRAP BDS., and more for the C64. Write or call for cat. Impact Electronics, 2116 E. Arapaho, Suite 599 Richardson, TX 75081, (214) 480-8070

FREE! USE YOUR MODEM! Call our innovative electronic shopping center, FANTASY PLAZA. VISA and MASTERCARD accepted. 300 BAUD. You've never seen anything like it! Use your Modem NOW! (818) 840-8066

Personal Computer Owners CAN EARN $1000 TO $5000 monthly, selling simple services performed by their computer. Work at home—in spare time. Get free list of 100 best services to offer. Write: C.I.L.D.I., P.O. Box 60369, San Diego, CA 92106-8369

AMIGA—LEARN THE FACTS. Detailed report tells all. Wondering if you should buy? Order today and find out. Send $3.95 to: MCC, Rt. 1, Box 414, Axton, VA 24054.

COMPUTE!'s Gazette Classified is a low-cost way to tell over 275,000 microcomputer owners about your product or service.

Rates: $25 per line, minimum of four lines. Any or all of the first line set in capital letters at no charge. Add $15 per line for boldface words, or $50 for the entire ad set in boldface (any number of lines.)
Terms: Prepayment is required. Check, money order, American Express, Visa, or MasterCard is accepted. Make checks payable to COMPUTE! Publications.
Form: Ads are subject to publisher's approval and must be either typed or legibly printed. One line equals 40 letters and spaces between words. Please underline words to be set in boldface.
General Information: Advertisers using post office box numbers in their ads must supply permanent address and telephone numbers. Orders will not be acknowledged. Ad will appear in next available issue after receipt.
Closing: 10th of the third month preceding cover date (e.g., June issue closes March 10th). Send order and remittance to: Harry Blair, Classified Manager, COMPUTE!'s Gazette, P.O. Box 5406, Greensboro, NC 27403. To place an ad by phone, call Harry Blair at (919) 275-9809.
Notice: COMPUTE! Publications cannot be responsible for offers or claims of advertisers, but will attempt to screen out misleading or questionable copy.

COMMODORE 128 REFERENCE LIBRARY

A detailed guide presenting the 128's operating system, explanations of the graphics chips, a concise description of the Memory Management Unit, and well documented ROM listings, much more. $19.95

This book is chock full of information which no '128 user should be without. It covers memory management, producing hires graphics in 80 columns, using windows, important memory locations and much more. $19.95

An insiders' guide for the novice and advanced users. Describes sequential and relative files, using direct access commands, directory organization, important DOS routines plus commented DOS listings. $19.95

An essential guide to using CP/M on your 128, with simple explanations of the operating system and its memory usage, using CP/M utility programs, creating submit files and many other subjects. $19.95

...and a sensational selection of COMMODORE 64 BOOKS

The Anatomy of the C-64
For two years a best seller. C-64 internals w/ROM listings. $19.95

Tricks and Tips for the C-64
Favorite among programmers. 75,000+ sold worldwide. $19.95

Peeks and Pokes for the C-64
Quickhitting, easy-to-use routines for every C-64 owner. $14.95

The Anatomy of the 1541
Revised, expanded edition. Detailed ROM listings. 500pp. $19.95

1541 Repair & Maintenance
Brand new! Keep your 1541 Disk Drive in top shape. $19.95

Science & Engineering on C-64
Intro to computers and the world of science. Real examples. $19.95

C-128 Computer Aided Design
CAD techniques using C-128/C-64. Many program examples. $19.95

Compiler Design/Implementation
Learn to design and write your own compilers. A how-to book. $19.95

The Graphics Book for the C-64
Most in depth treatment available. Dozens of techniques. $19.95

The Machine Language Book
Intro to machine language geared to the C-64. Assembler incl. $14.95

Advanced Machine Language
Techniques never covered before. interrupts, controllers, etc. $14.95

Printer Book for the C-64 & Vic
All about using various printers. Graphics, text, interfaces. $19.95

Cassette Book for the '64 & Vic
A must for cassette owners. High speed cassette system. $19.95

Adventure Gamewriters Hndbk
Write your own adventures. Learn strategy, motivation. $14.95

Ideas for Use on Your C-64
Dozens of interesting projects for your C-64. Easy to read. $12.95

Call **now** for the name of your nearest dealer. To order by credit card call **616/241-5510**. Other software and books also available - ask for **free** catalog. Add $4.00 for shipping per order. Foreign orders add $8.00 per book. Dealer inquires welcome - 1200+ dealers nationwide.

Abacus Software
P.O. Box 7211 Grand Rapids, MI 49510
For fast service phone 616/241-5510
Telex 709-101

fighting aliens in this space game, but you will be tested to the limits of your knowledge. Navigating through the solar system, using radar to locate the planets, then picking up your strip chart of the constellations to identify the appropriate star system is a challenge for the best celestial navigator.

By the time you complete your tenth mission, you'll recognize at a glance the signs of the Zodiac from the accurate screen displays. And you'll have acquired new knowledge about the planets of our solar system.

You don't win or lose in this game, only complete each of the assigned series of tasks. After finishing your missions, you'll be awarded the rank of Starbird. A secret number will appear on the screen which you can send to Mindscape to register your success. You'll then qualify for "The Final Project," a mission so secret that details will be mailed to you only after you've proven your ability as one of the best pilots in the solar system.

Although scientifically accurate, the graphics used in *The Halley Project* could be a little better in some cases. It would be nice to see the rings of Saturn during your approach, or the red spot and bands on Jupiter. But you won't soon forget the sight of the Earth eclipsing the Sun, followed by an eclipse of the Moon, if you're able to position your approach just right.

The Halley Project should be entertaining and educational for just about anyone over the age of 12 who has a passing interest in the heavens. However, you may need to consult an encyclopedia or a text on astronomy to complete the missions. The clue for your next objective might be to land on a moon which is larger than a planet. You can take a chance on one of the Jovian Satellites, or take a few minutes to look up some information.

Now let's see, is Titania a moon of Saturn or Jupiter?

—George Miller

Mindscape, Inc.
3444 Dundee Rd.
Northbrook, IL 60062
$39.95 (disk)

Omniwriter/Omnispell

Of all the word processors for the Commodore 64 I've had the opportunity to use so far, I prefer *Omniwriter/Omnispell* by HES.

The first thing about *Omniwriter* that impressed me was the documentation. The manual is well written and easy to follow. After spending only five to ten minutes with it, I felt I was ready to begin experimenting with the software. Thanks to the handy reference card and function key overlay, I was able to quickly and easily learn how to find my way around within *Omniwriter*. I was pleasantly surprised to find a help file and sample letter that come ready-to-load from disk. (They load as normal word processor documents.)

My favorite feature is the side scrolling capability. Since the 64's screen can only contain 40 characters per line, as you type or move the cursor toward one side of the screen, the text scrolls horizontally, moving the hidden areas of your workspace onto the screen. Similarly, you can scroll the screen vertically. The screen can be thought of as a window you can move anywhere over your document to view any portion of it. It even side scrolls up to 241 columns. This feature allows you to see almost exactly how your finished document will appear on paper and is one of the features of *Omniwriter* that puts it in a class by itself.

Another excellent feature of *Omniwriter* is its ability to automatically reformat your text on the screen as you change the page width. You can type in a document in 40 columns if you prefer, and then automatically reformat it to 80 columns for printing.

Entering text is very easy. As you type, the screen scrolls horizontally over the document when necessary, and it formats your document for you automatically. When you exceed the predetermined right margin, it brings the current word down to the next line as you continue typing. Typing a carriage return signifies the end of a paragraph. When you print your document, you have the option of having the right margin automatically justified.

The function keys allow you to quickly move forward and backward by a page or a screen at a time, move to the opposite end of a line, move to the next tab or end of line, delete text and/or insert text.

Deleting and inserting text is easy. Large portions of text can be quickly deleted by highlighting. Using the cursor controls, you highlight the text you wish to delete. Pressing RETURN then causes the highlighted text to vanish. Your document is automatically reformatted as you delete or insert text. Another function allows you to easily copy or move text from one part of the document to another by highlighting.

Special keystrokes in *Omniwriter* allow you to do such things as center a line of text, indent a paragraph, or indicate a page ending. In addition, you may set any number of tab stops and even align columns of numbers by decimal points with "numerical tab stops." There are built-in printer format symbols and the provision for up to ten user-definable printer format codes. These may control such print features as underlining, subscripts, boldface, etc. If your printer is not one of those supported by the predefined format codes, you can define your own.

In addition to the normal workspace for the main document, there are three additional "pages." One of them is a work page for your own personal notes. This can also be used to hold information to be merged into the main document. Information can be merged from an *Omniwriter* document or a BASIC sequential file as well. The two other pages are for headers and footers. These can hold information to be printed at the top or bottom of every page of your document and may also be used for page numbering.

Omnispell, the spelling checker provided with *Omniwriter*, is well done and nicely integrated. The dictionary of 30,000 words seems to be more than adequate for most purposes. In ordinary documents, such as this one, there are very few words—besides names and special technical terms—it will not recognize. My only major complaints about *Omniwriter* are the lack of a fully automatic pagination and page numbering option, and the absence of a provision to print more than one copy of a document at a time. You must indicate end of page with a special control character for each page, and another control character is used to indicate the placement of the page number on each page. In addition, the print command must be issued each time to print another copy. This requires you to start the next copy printing when the previous one is done. Other than these minor gripes, it seems the author has provided for just about everything one might want or need to do.

Omniwriter is a complete word processing package with mail merge capability and an integrated spelling checker. Its numerous advanced and easy-to-use features, along with its reasonable price, make it a flexible product which should meet the needs and budget of almost everyone.

—Michael Kleinert

Human Engineered Software
390 Swift Ave., Suite 14
S. San Francisco, CA 94080
$34.95 (disk)

*During the holidays, you can

SAVE A BUNDLE

SAVE SAVE SAVE

Bundle #9
Language Software

Super Pascal	$59.95
Super C	$79.95
regular price	$139.85
Special Price	**$95.00**

Bundle #10
Productivity Software

XPER *Knowledge Base*	$59.95
Cadpak *Enhanced*	$39.95
regular price	$99.90
Special Price	**$75.00**

Bundle #11
Development Software

Basic 64 Compiler	$39.95
VideoBasic	$39.95
Master *Development pkg.*	$39.95
Xref	$17.95
regular price	$137.80
Special Price	**$95.00**

Bundle #12
Reference Books

Anatomy of the C-64	$19.95
Anatomy of the 1541	$19.95
The Printer Book	$19.95
regular price	$59.85
Special Price	**$40.00**

Bundle #13
Helpful Books

Tricks & Tips	$19.95
Peeks & Pokes	$14.95
Ideas for Use on the C-64	$12.95
regular price	$47.85
Special Price	**$35.00**

Bundle #14
Machine Language Books

Mach. Lang. on the C-64	$14.95
Advanced Mach. Lang.	$14.95
Compiler Design	$19.95
regular price	$49.85
Special Price	**$35.00**

Bundle #15
Application Books

Graphics Book	$19.95
Computer Aided Design	$19.95
Science & Engineering	$19.95
regular price	$49.85
Special Price	**$40.00**

You Can Count On

Abacus Software

P.O. Box 7211
Grand Rapids, MI 49510
Phone 616/241-5510

Call for the name of your nearest dealer. Or order directly from ABACUS with your Mastercard, VISA or AMEX card. Add $6.00 for postage and handling per order. Foreign orders add $20.00 per bundle. Other software and books are also available. Call or write for **free** catalog. Dealer inquires welcome - over 1200 dealers nationwide.
* Offer expires December 31, 1985. Sorry, no substitutions permitted for this special offer.

LYCO COMPUTER

Marketing & Consultants

Buy Lyco and Enjoy:

- *THE LOWEST PRICES!!!
- *TOLL FREE ORDER LINE!
- *FREE Shipping on Prepaid Cash Orders in U.S.
- *All Merchandise Factory Fresh!
- *24 Hours Shipping on in stock product!
- *Access to our Multi-Million $ Inventory!
- *No Deposit on UPS COD Orders!
- *Orders Outside PA SAVE State Sales Tax!
- *Full Manufacturer's Warranty Apply!
- *Air Freight Service Available!
- *Full Accessory Line in Stock!
- *Purchase Orders Accepted from Educational Institutions!
- *We Check for Stolen Credit Cards!
- *You'll Love Our Courteous Sales Staff!
- *We Ship to Our Servicemen Overseas!

DISKETTES

(Box 10)

DENNISON

ELEPHANT 5¼" SSSD	11.99
ELEPHANT 5¼" SSDD	12.99
ELEPHANT 5¼" DSDD	14.99
PREMIUM 5¼" SSDD	13.99
PREMIUM 5¼" DSDD	15.99

SUNKYONG

SKC 5¼" SSDD	11.99
SKC 5¼" DSDD	13.99

MAXELL

5¼" MD1	13.99
5¼" MD2	19.99

VERBATIM

5¼" SSDD	13.99
5¼" DSDD	19.99

BONUS

5¼" SSDD	9.99
5¼" DSDD	12.99

NO LABEL DISKETTES

NL 5¼" SSDD...10.99 (Box 10)
NL 5¼" DSDD...15.99 (Box 10)

- *Free Diskette Writer Pen!
- *Free Storage Case!
- *Lifetime Warranty!

PAPER

3000 SHEETS FANFOLD	$42.75
1000 SHEETS FANFOLD	$19.75
1000 SHEET LETTER	$21.95
200 SHEETS LETTER	$8.99
150 RAG STATIONARY	$10.99
MAILING LABELS (1in.)	$9.95

COMMODORE SOFT-WARE

COMMODORE

C-128 NEW	CALL
1571 Drive	CALL
1572 Drive	CALL
1902 Monitor	CALL
1670 Modem	CALL
C-64 Computer	CALL
1541 Drive	189
MPS801 Printer	LOW
1702 Monitor	199
Simon's Basic	24.75
Assembler 64	34.75
Super Expander	22.75
Logo 64	49.75
Pilot 64	38.75
Easy Cale	34.75
Easy Script	38.75

SPINNAKER (C-64ROM)

Cosmic Life ROM	19.75
Jukebox	19.75
Alphabet Zoo	17.75
All in Color Caves	19.75
Up for Grabs	19.75
Delta Drawing	19.75
Kids on Keys	16.75
Kindercomp	14.75
Facemaker	17.75
Fraction Fever	17.75

MICROPROSE (C-64)

Kennedy Approach	21.75
Crusade in Europe	24.75
Decision in Desert	24.75
Solo Flight	20.75
Nato Commander	20.75
Spitfire Ace	18.75
F-15 Strike Eagle	20.75
Hellcat Ace	18.75

BATTERIES INCLUDED

Paper Clip	59.95
Spell Pak	34.95
Consultant	59.95
Paper Clip w/Spell Pak	75.95
Home Pak	34.95
Bus Card	129.95
80 Column Board	109.95

SUB LOGIC (C-64)

Flight Simulator II	*32.75*
Night Mission Pinball	20.75

QR & D

Copy Q	*27.95*
GPC Printer Interface	65.00

BRODERBUND

The Print Shop	28.75
Graphics Library	18.75
Graphics Library II	19.75
Graphics Library III	19.95
Karateka	19.75
Castles Dr. Creep	19.75
Bank St. Writer	32.75
Loderunner	20.75
Mask of the Sun	24.75
Spelunker	19.75
Serpent's Star	24.75
Whistler's Brother	18.75
Raid Bungeling Bay	18.75

SSI (C-64)

Colonial Conquest	24.75
Wings of War	24.75
Computer Ambush	34.75
Field of Fire	24.75
Fighter Command	36.75
Kampfgruppe	36.75
Mech Brigade	36.75
Market Garden	29.75
Six Gun Shootout	24.75
Computer Baseball	24.75
Computer Quarterback	24.75
Imperium Galactum	24.75
Phantasie	24.75
Cartels & Cutthroats	24.75
50 Mission Crush	24.75
Questron	24.75

EPYX (C-64)

Fast Load	26.75
Breakdance	23.75
Greatest Baseball	24.75
Summer Games	26.75

EASTERN HOUSE

Rabbit C-64	19.95
Rabbit VIC-20	19.95
MAE C-64	27.95
Telstar 64	19.95
M.L. Monitor 64	18.95

CONTINENTAL (C-64)

Home Accountant	44.75
1984 Tax Advantage	35.75
1985 C-64 Book of Software	16.95

SYNAPSE-64

Essex	23.95
Brimstone	23.95
Lode Run Rescue	18.95
Syncalc	33.75
Syncalca Temp	12.95
Mindwheel	23.95

PRECISION SOFTWARE

Superbase 64	52.75

CARDCO

Digitizer Camera	189.95
32K Printer Buffer	59.95
Numeric Keypad	34.95
CB/5 5-slot Board(64)	54.00
CB/2 2-slot Board(64)	25.00
S'More Basic Rom	49.95
Write Now-64	35.00
Mail Now-64	29.00
Spell Now-64	29.00
File Now-64	29.00
Paint Now-64	29.00
Calc Now-64	29.00
Tax Survival	29.00
Super Printer Utility	27.95
Write Now-Vic-20	29.95

PERSONAL PERIPHERALS

Super Sketch 64	32.75
Printer Utility	18.75

KOALA (C-64)

Koala Pad	59.95

SCARBOROUGH (C-64)

Build A Book	24.75
Improved Mastertype	23.75
NET WORTH	48.75
Mastertype Filer	22.75
Boston 64 Diet	27.75

WICO Joysticks

15-9714 Bat Handle	16.75
50-2030 Boss	11.99
50-2002 Super 3-Way	19.99
50-0110 IBM-Analog	29.95
50-1030 Apple-Analog	29.95
72-4545 Trackball	29.95

INNOVATIVE CONCEPTS

Flip-n-File 10	3.50
Flip-n-File 15	8.25
Flip-n-File 25 Lock	17.95
Flip-n-File 50	17.25
Flip-n-File 50 Lock	22.95
Flip-n-File Rom	17.25

COMPUTER CARE

NORTRONICS DISK DRIVE CLEANER

with software

REG. 49.95 NOW 19.95

AMERICA'S MAIL ORDER HEADQUARTERS

LYCO COMPUTER

WORLD'S LEADER IN SALES & SERVICE

TO ORDER
CALL TOLL FREE
800-233-8760
In PA 1 717-327-1824
Lyco Computer
P.O. Box 5088
Jersey Shore, PA 17740

LYCO COMPUTER

Marketing & Consultants

SG-10 .. $208.00

AXIOM SEIKOSHA

GP550AT (Atari)	222
GP550CD (C-64	222
GP700AT (Atari)	439
GP700AP (Apple)	439
ELITE5CD (C-64)	229

C. ITOH

8510Ap+	299
1550P	437
1550BP	437
1550EP	437
1550BCD	469
F10-40	859
F10-55	1039
7500AP	204
7500AR	244

TOSHIBA

P1340	557
P351	1286

SAVE ON THESE IN STOCK PRINTERS

CARDCO

32K BUFFER (C-64)	59

CORONA

LP300 Laser Printer	2686
200361 Toner Cartridge	89

EPSON

FX85 (New)	333
LX80	212
FX185 (New)	464
LX90 (New)	226
SQ2000 (New)	1555
JX80	467
Homewriter 10	193
CR-20-Atari	153
CR-220-C-64	153
DX-10 (New)	207
DX-20 (New)	297
HS-80 (New)	288
LQ1500P	975
LQ1500S	1039
RX-100	356
FX-100+	CALL

CITIZEN

MSP-10	269
MSP-15	358
MSP-20	337
MSP-25	495
Sheetfdr (10/20)	189
Sheetfdr (15/25)	199

OKIDATA

Okimate 10	179
Okimate 20	CALL
182	214
192	348
193	563
92P	349
93P	565
84P	645
92 Imagewriter	349

*IBM versions also

BROTHER

HR-15XL-P	359
HR-15XL-S	359
HR-35P	839
HR-35S	839
2024L-P	949
M1009-P	189

JUKI

Juki 6100	347
RS232 Serial Board	55
6100 Tractor	119
6100 Sheet Feeder	209
Juki 6300	757

LEGEND

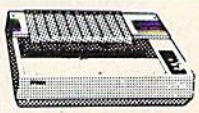
880	188
1080	222
1380	262
1385	296

DIGITAL DEVICES

16K BUFFER	75
32K BUFFER	89
64K BUFFER	125

DIABLO

D25	549
630API	1599
630ECS	1759
D801F	2395
P32CQ1	699
P38	1749
C150	999



1091 . . . $233.00

PANASONIC

1091	233
3131 (NEW)	269
1092	373
1093	426
3151 Letter	426
4K Buffer	65

SILVER REED

EXP400	249
EXP500	295
EXP550	399
EXP770	749

STAR MICRONICS

SG-10	208
SG-15	373
SD-10	336
SD-15	442
SR-10	483
SR-15	583
Powertype	303
SB-10	CALL
SG-10C-64 (NEW)	CALL

MONITORS

AMDEK

300 Green	118
300 Amber	128
310 Amber IBM	155
Color 300 Audio	234
Color 500 Composite	369
Color 600	397
Color 700	495
Color 710	569

TEKNIKA

MJ-10 Composite	179
MJ-22 RGB	255

TAXAN

115 12" Green Composite	CALL
116 12" Amber Composite	CALL
121 12" Green TTL	135
122 12" Amber TTL	145
220 14" Color Composite	259
410 12" RGB Hi Res IBM	329
420 12" RGB Super Hi IBM	409
440 12" RGB Ultra Hi Res	555
Tilt Stand	35

PANASONIC

DT1300D	13"	RGB/Composite 247
DTM140	14"	RGB/Composite 329
DTH103	10"	RGB Hi Res 395
DTS101	10"	Composite 175
DT1000G	10"	RGB 166
TX12H3P	12"	Color 419
TR120M1PA	12"	Green 109
TR120MBPA	12"	Amber 109
TR122M9P	12"	Green IBM 148
TR122MYP	12"	Amber IBM 148

ZENITH

ZVM 122A Amber	75
ZVM 123G Green	75
ZVM 124 Amber IBM	129
ZVM 131 Color	275
ZVM 133 RGB	389
ZVM 135 Composite	449
ZVM 136 Hi Res Color	589
1220 1230 1240	CALL

NEC

JB-1260 Green	95
JB-1201 Green	135
JC 1215 Color	235
JC 1216 RGB	375
JC1460 Color	265
JB-1205 Amber	139

PRINCETON GRAPHICS

MAX-12 Amber	185
HX-12 RGB	465
SR-12 RGB	595

X-TRON

Comcolor I Composite Green	177

SAKATA

SG1000 12" Green	99
SA1000 12" Amber	109
SG1500 12" Green TTL	119
SA1500 12" Amber TTL	129
SC100 13" Color Comp	209
SC200 13" RGB	389
STSI Tilt Stand	29

DRIVES

INDUS

GT ATARI	199
GT COMMODORE	199

COMTEL

Enhancer 2000 (c-64)	179

MSD

SD1 Drive (C-64)	229
SD2 Drive (C-64)	469

INTERFACING

AXIOM

Parallax (C-64)	65

DIGITAL DEVICES

U-Print C (C-64)	49

ORANGE MICRO

Grappler CD (C-64)	79

QRD

GPC (C-64)	59

CARDCO

G-Wiz (C-64)	54
C/?+G (C-64)	45
C/?PS (C-64)	49
C/?B (C-64)	39

TYMAC

Connection (C-64)	55

MODEMS

HAYES

Smartmodem 300	133
Smartmodem 1200	377
Smartmodem 1200B	347
Smartmodem 2400	596
Micromodem IIE	135
Westridge (C-64)	59
Mitey Mo Modem	69
Compuserve	19.85

NOVATION

IBM 300/1200 MS-DOS ext	319
IBM 300/1200 CPM-86 ext	319
IBM 300/1200/2400 ext	529
Microbits 1064 Modem	57

RACAL-VADIC

2400PC	549
2400PA	799
2400V	559

TELE LEARNING

Total Telecommunications (C-64)	29.95
AP-250 (300 Baud Apple)	69.95
IB-250 (300 Baud IBM)	69.95

ANCHOR

Volksmodem	55
Volksmodem 12	186
Mark 12	229

TOLL FREE 1-800-233-8760

MasterCard VISA

TO ORDER

CALL TOLL FREE

800-233-8760

Customer Service 1-717-327-1825 Jersey Shore PA 17740

or send order to

Lyco Computer

P O Box 5088

RISK FREE POLICY

In-stock items shipped within 24 hours of order. No deposit on C.O.D. orders. Free shipping on prepaid cash orders within the continental U.S. Volume discounts available. PA residents add sales tax. APO, FPO, and international orders add $5.00 plus 3% for priority mail service. Advertised prices show 4% discount for cash, add 4% for MasterCard or Visa. Personal checks require 4 weeks' clearance before shipping. Ask about UPS Blue and Red label shipping. All merchandise carried under manufacturer's warranty. Free catalog with order. All items subject to change without notice.

International Hockey

You deftly steal the puck from the opposing center, whirl, and race down the ice. As you zip across the blue line, into the opposing team's territory, a quick fake throws the defenseman off stride. You take advantage of his slip, dive inside, draw back, and fire a shot at the net. The goalie misses. You score! You've led your team to the Stanley Cup championship—a familiar fantasy for most hockey fans.

Now you can simulate this dream without having to lace up your skates. *International Hockey* for the Commodore 64 lets you try for the Stanley Cup or power the U.S. Olympic Team to another gold medal.

The game gives you the option of playing against the computer (a tough challenge) or another person. You can select a regular three-period game or a penalty-shot competition in which you alternate between playing goalie and trying to score on the opposing team's goalie. Either mode of play allows you to choose from three levels of difficulty: beginner, medium, and expert. You control one player at a time by using the joystick, so good reflexes are a help. Even on the beginner level, the computer plays a tough game and you'll have to work hard to win.

Good graphics, crowd noise, the sound of the puck slapping against the stick, and the use of speech synthesis are attractive enhancements to *International Hockey*. You'll hear the announcer shout "He scores!" when you've just given up another goal to the opposing team.

Each period lasts for three minutes, and is filled with action as you scramble for the puck. Body checking is permitted, and you can take an opponent out of the play by knocking him down. But be warned, the officials are watching, and you may be penalized for excessive roughness. On higher levels of play, you may find after trying a body check that you're the one getting up while the opposition is homing in on your goal.

If you hit an opposing player too often, he may lose his temper, causing a fight. This could prove to be costly, as a penalty shot is awarded to each side. You might find yourself a goal down very quickly—the computer is tricky when it goes one-on-one. *International Hockey* is a fun way to fill those long winter nights when the hometown team is on the road.

—George Miller

Artworx Software Company, Inc.
150 North Main St.
Fairport, NY 14450
$24.95 (disk)

also worth noting

Charlie Brown's ABC's

Charles Schultz' familiar characters from the *Peanuts* comic strip make learning the alphabet fun in *Charlie Brown's ABC's*. Young children can easily operate the program; after loading, just type a letter on the keyboard and watch it appear on the screen, along with a picture of an object that starts with that letter. Pressing the same letter key again starts a short animated sequence. Snoopy pops popcorn wearing an *A*pron, and pulls Woodstock (wearing rabbit ears) out of a *H*at. Charlie Brown tries once again to kick a *F*ootball before Lucy can pull it away. Linus suddenly loses interest in his *I*ce cream cone when Snoopy decides to taste it. To go through the alphabet sequentially, cursor keys can be used, helping children to learn the order as well as recognize letters. The accompanying manual contains suggestions for learning activities with or without the computer, games that help children learn both the alphabet (upper- and lowercase) and the placement of letters on a keyboard. Though *Charlie Brown's ABC's* is designed for children ages three to seven, adults who grew up with the *Peanuts* characters may enjoy running the program just to see some old friends.

Random House Electronic Publishing
201 E. 50th St.
New York, NY 10022
$29.95

XPER

Expert systems are hardware/software combinations that store vast quantities of information and make intelligent decisions based on that material. Researchers in computer science, robotics, and artificial intelligence are struggling to refine their definition of expert systems, and exploring potential applications. *XPER* is a *knowledge-based management system*, something like a smart database, for the Commodore 64 (or 128 in 64 mode). It can find and deduce facts from an existing base of information. Using *XPER*, it's possible to answer a series of pre-defined questions, pose a problem, then let the program arrive at the logical conclusion, based on the information you supplied. The uses for a system such as *XPER* are extensive, especially in computer-assisted identification and diagnosis. The documentation included with *XPER* makes it easy to set up your own knowledge base. Anything that can be described with specific characteristics or attributes can be the basis for use with this system. On-screen prompts and a handy Help command are available.

Abacus Software
P.O. Box 7211
Grand Rapids, MI 45910
$59.95

NEW UPDATED VERSION
Now Includes 1541 FAST NIBBLER

ANOTHER MASTERPIECE

The Programmer **MIKE J. HENRY** has done it AGAIN with

FAST HACK'EM

FOR THE COMMODORE 64

DUAL DRIVE **MSD**
- Automatic back-up of nearly all protected disks in ***68 Seconds!***
- Using unique track analyzation process, protection schemes are treated as normal data giving you an original back-up.
- Equipped with Special Auto-Back-up.**

SINGLE **1541**
- FASTEST single drive back-up ever made, less than ***2 Minutes!***
- Backs-up all standard disks in only ***3 Passes!***
- Nibbles protected disk in less than ***3 Minutes!***

TWO DRIVES **1541**
- Automatically backs-up a standard disk in only ***35 Seconds!***
- Nibbles protected disk in less than ***60 Seconds!***
- Also equipped with Special Auto-Back-up**

Dealer Inquiries Welcome!

****SPECIAL**
Auto-Back-up After booting up, the computer is no longer necessary, and may be disconnected. The drives automatically detect the disk being inserted and removed. An absolute must for multiple back-ups!!!
All routines are highly reliable and include full verify option.

EASY TO USE
ALL VERSIONS ON ONE DISK

ONLY $29.95
ADD $3.00 SHIPPING

VISA, MasterCard — Check, Money Order, **VISA, MASTERCARD** Accepted
Add $3.00 for C.O.D.'s

ALWAYS SAME DAY SHIPPING

BASEMENT BOY'S SOFTWARE
P.O. Box 30901 Portland, OR 97230-0901
(503) 256-5506

C64, VIC20 POWER SUPPLY

PS01 $29.95

UL LISTED EXTRA POWER TO TAKE CARE EXTRA LOADS AND HEATING PROBLEMS BEATS THE ORIGINAL

OUTPUT	MAXTRON	COMMODORE
5V D.C.	3.0 A	1.0 A
9V A.C.	1.0 A	0.5 A

DATA SETTE FOR C64, C128, VIC20

$19.95 Special DC01

- FUNCTION SAME AS VIC 1530 EXCEPT THE PRICE
- GREATE FOR SCHOOL & GAMES
- LOWEREST COST STORAGE SYSTEM

Surge Protected & Noise Filtered Power Center. (PO01) $69.95

PO01

TAKECARE OF SURGE & NOISE FROM POWER SOURCE. SIX LIGHTED SWITCHES CONVENIENT CONTROL FIVE OUTLETS. UL LISTED STANDARD CIRCUIT BREAKER & 6 FOOT CORD. IVORY COLOR SLIM CASE TO TAKE MIN SPACE UNDER YOUR MONITOR

C64, C128 CONTROLED R/C TANK

X' Mas Special $99.00

THE 15 TANK C64 INTERFACE BOX COMES IN THREE FREQ. ENABLE A RACE OR MOCK BATTLE OF THREE TANKS. RUN WELL ON CARPET, GRASS ETC. THE SOFTWARE ENABLE CAN TO MEMORIZE, MODIFY & RERUN UP TO HALF AN HOUR OF MOVEMENT IN FORWARD, RIGHT, LEFT, REVERSE, STOP INPUTED BY YOUR C64 JOYSTICK

Surge Protected Power Outlets

(PO02) $15.95

TAKECARE SURGE FROM POWER SOURCE. LIGHTED SWITCH. CIRCUIT BREAKER. SIX FOOT CORD. STEEL CASE IN IVORY COLOR. ALL IN UL STANDARD

Graphic Mouse (GM01) $69.95

CREATE BEAUTIFUL GRAPHIC WITH THIS USER FRIENDLY PROGRAM FUNCTIONS INCLUDED SKETCH, LINE, LINES, POINTS, BOX, FRAME, HOME, VERT. AND CIRCLE, FILL, ERASE, BACKGROUND, INVERSE, CATALOG, SAVE PICTURE, MOVE, CUBE, LOAD PICTURE, DRAW, FILLIN, CLIPS ... ETC.

Compurobot RB01 $39.95

6.5' TALL ROBOT WITH A MICROCOMPUTER PROGRAMMABLE VIA SYMBOLIC KEYBOARD ON TOP. DOES A SERIES OF 40 ACTIONS IN FORWARD, BACKWARD, LEFT, RIGHT, STOP & SOUND WITH BUILT IN DEMONSTRATION PROGRAM. A GREAT EDUCATIONAL TOOL TO TEACH ABOUT COMPUTER & ROBOT USE ONE 9 VOLT & 4 AA BATTERIES (NOT INCLUDED)

Dual 5.25" Disk Drive for C64

DD04 $339.95

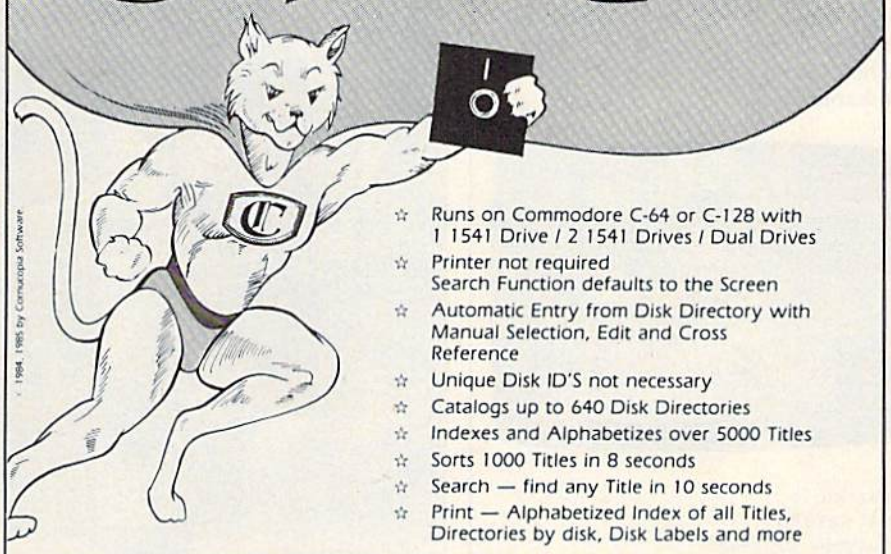
TWO SUPER DRIVES IN A COMPACT CASE. FASTER, QUIETER & MORE RELIABLE THEN THE ORIGINAL DRIVE. CONVENIENT FOR MAKING BACK UP

THE AMAZING KEY FINDER RESPONSES TO YOUR HAND CLAP IN BEEP BEEP SOUND. $9.95 + 2.0 S&H 90 DAYS WARRANTEE FOR MOST ITEMS

MAXTRON 1825A DURFEE AVE., S. EL MONTE, CA 91733
(818) 350-5707 VISA & MASTERCARD ACCEPTED

SHIPPING & HANDLING $4.00 EXCEPT DD04 $10.00 PO01 $8.00 CAN ADD 8.5% TAX
DEALERS WELCOMED

SUPERCAT



© 1984, 1985 by Cornucopia Software

- ☆ Runs on Commodore C-64 or C-128 with 1 1541 Drive / 2 1541 Drives / Dual Drives
- ☆ Printer not required
  Search Function defaults to the Screen
- ☆ Automatic Entry from Disk Directory with Manual Selection, Edit and Cross Reference
- ☆ Unique Disk ID'S not necessary
- ☆ Catalogs up to 640 Disk Directories
- ☆ Indexes and Alphabetizes over 5000 Titles
- ☆ Sorts 1000 Titles in 8 seconds
- ☆ Search — find any Title in 10 seconds
- ☆ Print — Alphabetized Index of all Titles, Directories by disk, Disk Labels and more

Have you ever "lost" a program — it's on one of your disks, but which one? Despair no more! **SUPERCAT**, THE Disk Catalog System, has arrived!

$29.95 (U.S.) Includes shipping within USA
Includes backup copy of program disk
Add $4 for COD Orders – $6 for Shipping Outside of USA

MasterCard VISA Order your copy today!
(503) 293-3437
☆ Lines open 24 hours a day.

Cornucopia Software
P.O. BOX 2638, Portland, OR 97208 -2638
Please allow 4 to 6 weeks for delivery. Dealer inquiries invited.

Karate Champ

Test your skill at martial arts against a human opponent or against your Commodore 64 as you battle your way through a series of matches at nine different locations. You must win two out of three 30-second rounds to win a match and receive the right to earn bonus points before the next match begins at a new location. Menu selection makes setting up *Karate Champ* easy, but the many joystick-controlled moves during a round can be much more challenging. A variety of difficulty levels, excellent graphics, and effective use of sound combine to make *Karate Champ* an entertaining game.

Data East
470 Gianni St.
Santa Clara, CA 95054
$29.95 (disk)

Winter Games

Like its predecessors, *Summer Games* and *Summer Games II*, *Winter Games* lets you participate in the Olympic games while sitting in front of your computer. Choose a country, then practice any of the six events: bobsled, ski jump, figure skating, free-style skating, hot dog aerials, and the biathlon. Practice as much as you need, then sit back and watch the opening ceremonies before starting competition. Up to eight individuals may play at one time. All events are joystick-controlled; easy-to-follow directions explain how to maneuver your athlete for each challenge. Every time a gold medal is awarded, the national anthem for the victorious country plays while its flag is displayed. Like *Summer Games* and *Summer Games II*, *Winter Games* employs superb graphics and animation.

Epyx, Inc.
1043 Kiel Ct.
Sunnyvale, CA 94089
$29.95 (disk)

PUT YOUR 64 TO WORK!!
START A HOME BUSINESS
PRINT SIGNS TO SELL WITH
FOR SALE 491-6502
HELP WANTED
THE BANNER MACHINE
YARD SALE
TODAY'S SPECIALS
THINGS $4.95
WIDGETS $6.95
DELUXE WIDGETS $17.50
$19.95
THE BANNER MACHINE IS THE ONLY PROGRAM THAT PRODUCES PROFESSIONAL QUALITY SIGNS!!
YEARBOOK MEETING CANCELLED
CUSTOM SIGNS FOR SALE CALL YOU!!
HOLIDAY GREETINGS
1-800 762-5645
13646 Jefferson Davis Hwy, Woodbridge, VA 22191, Info. call (703) 491-6502
In Canada APPN MICRO 1283 Pharmacy Ave Scarborough, Ontario M1R 2J1 (416) 443-0843
Printers: Epson MX (with Graftrax), RX, FX, JX, LQ; Gemini 10 & 15; Commodore MPS 801, 1525E; Banana; Panasonic P1090; Seikosha GP100A; Riteman II, Plus, 15, Mannesmann Tally, Spirit 80, Okidata 82A, 83A with Okigraph 92A, 93A, Prowriter 8510, C. Itah 8510.
THE BANNER MACHINE (INCLUDING 5 FONTS) $49.95
OPTIONAL FONT DISK (INCLUDING 4 FONTS) $39.95
Cardinal Software

New dimensions in Bible study.
THE WORD processor
The KJV or NIV Bible on disks. Search for any word or phrase, create personal indexes, print any verse. Build your own library of Scripture references. $199.95
THE GOSPELS
The KJV Gospels text on disk. Display, search or print any part of the Gospels. This product is a subset of THE WORD processor. (Commodore 64 only) $59.95
Include $3 postage/handling.
"Software for personal Bible study"
Bible Research Systems
2013 Wells Branch Parkway, Suite 304
Austin, Texas 78728
(512) 251-7541
For Apple, IBM PC, Commodore 64, TRS80, Kaypro, CPM 2.2, MS-DOS.

FREE GAME OFFER

VOTALKER C-64

New From Votrax

- Easy to Use — Plug In and Speak
- Clear, Unlimited Speech
- Screen Echo Speaks Words and Symbols
- Character Mode Spells Each Word
- Rate, Pitch and Volume Controls
- Completely ROM Based, No Software to Load
- Self-Contained Speaker

The ultimate speech synthesizer for the Commodore 64.

Also Introducing Trivia Talker II*

- Votalker C-64 Version of Votrax's Popular Talking Trivia Game
- Five Game Categories for Up to Four Players
- Create Your Own Questions and Answers
- Multiple Choice Questions With Timed Responses
- Questions and Answers Displayed and Announced

Special Offer

- Buy Votalker C-64 for **$99.95**
- Get Trivia Talker II ~~$39.95~~ **FREE**

Other Votrax Products:

- PSS, T-N-T, Stand-Alone Devices
- IBM, Apple II Plug In Board Synthesizers
- Votrax Speech Chips

votrax®

VOTRAX, INC.
1394 Rankin Troy, Michigan 48083-4074
(313) 588-2050 TWX-8102324140 Votrax-TRMI

Call Votrax at (800) 521-1350

*Trivia Talker I operates only through the Commodore 64 on board SID chip. Price: $39.95

simple answers to common questions

Tom R. Halfhill, Staff Editor

Each month, COMPUTE!'s GAZETTE *tackles some questions commonly asked by Commodore users and by people shopping for their first home computer. If you have a question you'd like to see answered here, send it to this column, c/o* COMPUTE!'s GAZETTE, *P.O. Box 5406, Greensboro, NC 27403.*

Q. I've read many articles in your magazine concerning the Commodore 64 and not being able to get a good 80-column screen with a composite color monitor. Why can't it be done? Also, Sony has announced a multiscan monitor, available in 13- and 20-inch screens. It displays pictures sent to it from a new TV component called a digital scan converter. The scan converter grabs two incoming scan lines, averages them to determine what a third line should look like, and then adds the new line between the original two for display. The result is a picture with twice as many lines—twice the normal resolution. Instead of showing 525 lines each 1/30 second, the screen displays 1,050. Would this type of TV/monitor not be ideal for the 64?

A. We've seen this Sony monitor at the last Consumer Electronics Show. It does indeed display a much sharper picture than normal TVs and monitors. However, we have yet to see one attached to a computer, so we aren't sure what the result would be. At this writing, the monitor isn't available in the U.S.

In any case, increasing the *vertical resolution* by adding extra scan lines does not address the problem of displaying 80-column text, which is mainly limited by the screen's *horizontal resolution*. To get an 80-column display with a 40-column Commodore 64, you must either add the video circuitry necessary to display twice as many pixels (screen dots) per horizontal line, or else split each 40-column character in two. The first method (used by plug-in video boards) strains the horizontal resolution of composite color monitors and TVs, because few are designed to sharply display that many pixels per line. The second method (used by "Screen-80," COMPUTE!'s GAZETTE, September 1984) displays 80 characters with the same number of pixels as 40 characters, so the effective resolution of each character is halved. Instead of 40 characters 8 pixels wide, there are 80 characters only 4 pixels wide. The number of pixels across remains constant at 320.

Although you can display 80 columns on a composite color monitor, or even a TV, the characters may not be sharp enough for extended use without eyestrain. Most people who spend many hours working with text displays (such as programmers and writers) prefer the sharpest possible screen. The most economical way to obtain a sharp 80-column screen with a Commodore 64 is to hook up a monochrome monitor. An alternative is to try using a color monitor with separate inputs for the luma and chroma signals, such as the rear connections on a Commodore 1701/1702.

Q. I've heard about printer buffers for printers, but I'm not exactly sure what they do. Is it true that they speed up your printer?

A. A printer buffer won't speed up your printer, but it can save you time whenever you have to use the printer.

Printer buffers help even out the tortoise-hare mismatch between printers and computers. Because printers are basically mechanical devices, their speed is very limited compared to computers. Most personal computer printers operate at less than 200 characters per second, even in their fastest modes. A computer, on the other hand, is easily capable of sending out thousands of characters per second.

To solve this problem, printer interfaces use a system called *handshaking*. In effect, the printer and computer constantly communicate with each other so the computer won't send characters faster than the printer can print them. This works fine, except that the computer must slow down to the speed of the printer. It might take five or ten minutes or more to print out a long program listing or document because the computer spends most of its time waiting for the printer to ask for more characters. Since you can't do anything else with the computer in the meantime, it slows you down to the speed of the printer, too.

A printer buffer keeps the printer from tying up the computer by providing a temporary storage area for the characters or graphics being printed. The buffer is a memory device that hooks up between the computer and printer and accepts output as fast as the computer can send it. Then it feeds the output from this reservoir to the printer at the printer's speed, freeing the computer to do other things.

Printer buffers are available with different amounts of memory. For maximum efficiency, a printer buffer should have enough memory to hold the largest file you're likely to print. For instance, if you're working with a word processor and frequently printing out documents about 30K long, you should consider a printer buffer with at least 30K of memory. Otherwise, the computer will still be tied up after the buffer fills.

FOR COMMODORE 128 AND C-64 OWNERS ONLY:

This is just 1 of 15 pages of the newest and biggest Skyles catalog, hot off the press.

We know you'll want this page, in its full 8½ x 11 splendor, and another 14 pages of peripherals, software and books that will make your Commodore 128 or C-64 computer even nicer to live with.

So, if we missed sending you your very own copy within the last few weeks, call us at (800) 227-9998, unless you live in California, in which case call (415) 965-1735.

Skyles Electric Works
231E South Whisman Road
Mountain View, CA 94041

From Skyles Electric Works, the oldest and largest professional specialists in the business.

QUICKSILVER™
Is the fastest IEEE-488 Interface available for the Commodore 64. How fast? As fast as the external IEEE-488 device will allow. For example, a program or file will load over four times faster from a Commodore 4040 or 8050 disk drive as compared to a 1541 disk drive. QUICKSILVER loads 5 times faster than a serial MSD drive. When used with printers speed is only limited by the printer.
QUICKSILVER is transparent. QUICKSILVER does not occupy any program memory. Almost all programs are completely compatible with QUICKSILVER. A word of caution, some IEEE drives have different formats, and 1541 formatted programs are not going to load. Some programs protect the disk by varying 1541 disk memory. These programs will not ...rations in the 1541 disk drives. However, for most uses QUICK... and transparent.
...easy to plug into the cartridge port. ...the built-in horizontal, ...IEEE device within ...2 meter
Now Available For C-128
IEEE cable. Easy to select which device numbers you want QUICKSILVER to interface to the IEEE bus. Easy to use with almost all programs. Easy to buy, at an amazingly low price, from Skyles Electrics Works or your local dealer.
QUICKSILVER, C-128 Cartridge ..... $129.95 FALL SALE 99.95
QUICKSILVER, C-64 Cartridge 129.95 99.95

HAVE YOU GOT THE 1541 BLUES?

WE'VE GOT THE PERMANENT FIX!!
Here's what we do . . .

FIRST, we disassemble your 1541 disk drive.
SECOND, we re-machine the stepper motor to the shaft.
THIRD, we adjust the stepper motor and align the heads.
FOURTH, we upgrade your DOS to the latest version available.

GUARANTEED FOR SIX MONTHS!
AND WE DO IT ALL IN 72 HOURS OR LESS!!
TOTAL COST . . . $69.95, plus $7.50 shipping & handling

We also service the entire Commodore Line with a 72 hour turn-around time (subject to parts availability).

C-64	59.00
1541	65.00
1702	85.00
1525/801	59.00
1526/802	75.00
1541 Flash Installed	125.00

(Includes DOS Bridge and Switch for 100% Software compatibility)

Call for Repair Prices on other Commodore Equipment
We also repair Televideo Computers and Okidata Printers

WE DO WARRANTY REPAIRS! — Call for Details
$7.50 for shipping/$15.00 for APO/FPO or outside Continental US.
Our BBS No. is 919-765-3892, Temporary Password — TRIAD

TRIAD COMPUTERS
3068 TRENWEST DRIVE, WINSTON-SALEM, NC 27103
919-765-0433

kyan PASCAL
For the Commodore 64

kyan pascal is the most complete package available for learning and using the Pascal language.

kyan pascal is easy to use, lightning fast, and loaded with features. It's a full Pascal implementation. It compiles and runs many times faster than other Pascal compilers.

kyan pascal features:

- Optimized Machine Code Compiler;
- Built-In Full Screen Text Editor;
- String-Handling, Chaining, Include File, and Other Powerful Extensions;
- Random Access Files and Full Graphics Support;
- Built-In Assembler (Allows Full Hardware Control);
- 13-Digit Arithmetic Precision; and,
- Tutorial Manual with Sample Programs.

kyan pascal requires 64K of memory and a single disk drive. No additional hardware is necessary. And, it comes with kyan's MONEY BACK GUARANTEE...**If not completely satisfied, return it within 15 days for a full refund.**

kyan pascal for the C64 ..... ***$69.95***
(Add $4.50/copy for handling; $12.00 outside North America; California residents add $4.55/copy for sales tax)

Send Check/Money Order to: ***kyan software,*** Dept. X
Call: (415) 775-2923 1850 Union St., Ste. 183
MC/Visa Accepted San Francisco, CA 94123

WORLD TRADE

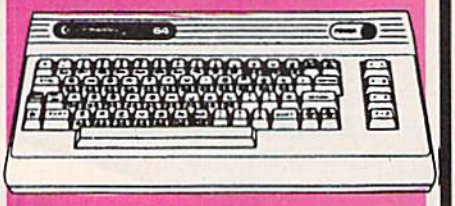
FOR THE BEST & LATEST COMMODORE EQUIPMENT AT THE LOWEST PRICES

You'll Get the Buy of a Lifetime!

commodore

C-64 COMPUTER

$137

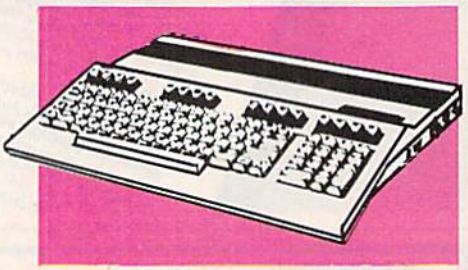


• Upper & lower case • Sprite graphic • Sid sound chip • Built in Basic.

commodore

128K COMPUTER

CALL!



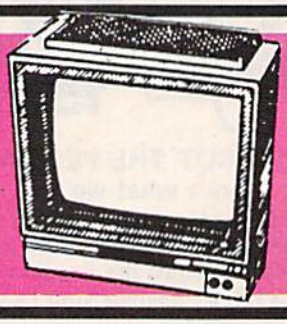
• 128K expandable to 512K • 40 and or 80 column full color display • Professional typewriter keyboard with numeric key pad • Built in basic • Full CP/M plus.

commodore

1702 MONITOR

$179

1902 COMMODORE MONITOR NOW AVAILABLE



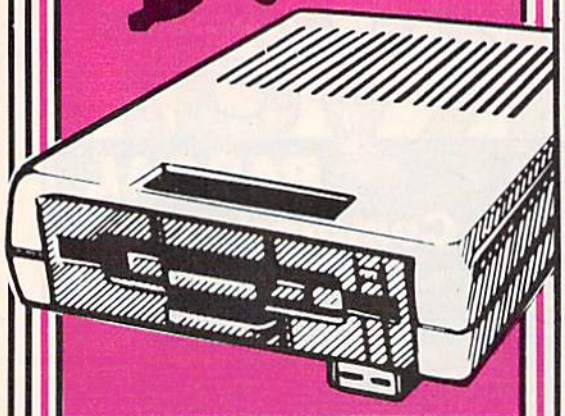
• Extra clear picture from separate video luminance input • Audio input speaker.

AMIGA

CALL

FOR AVAILABILITY & PRICE

Ram 256K Exp. to 512K, 16 & 32 Bits, 3½" floppy drive, 880K storage, 8 programable Keys, 89 Keys plus numeric key pad.



ENHANCER 2000 DISK DRIVE

159.99

Super high speed slim sign construction commodore compatable direct drive motor.

TO ORDER CALL 1-800-722-4002

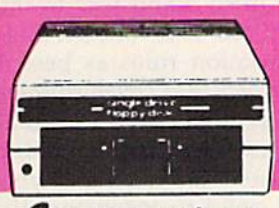
VISA MasterCard C.O.D.

IN NEW YORK VISIT OUR 5 SUPER SIZE STORES, WEST BABYLON, NEW HYDE PARK, PATCHOGUE, SYOSSET, BAYSIDE

commodore

WORLD TRADE

COMPUTER WHOLESALERS



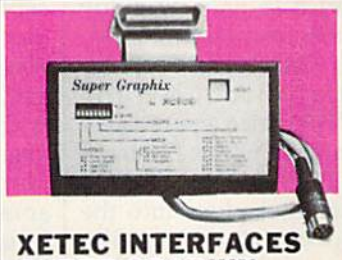
commodore

1541 DISK DRIVE

- Lets you store & retrieve programs & other information you create on your computer.

$159

COMMODORE 1571 DISK DRIVE
Call for Price & Availability



XETEC INTERFACES SUPER GRAPHIX

69.95

- 8K Buffer
- 10 printing modes.

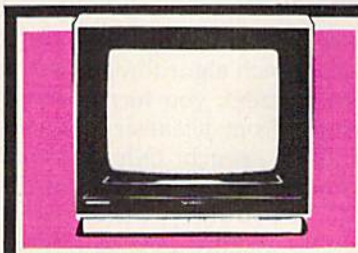
SUPER GRAPHIX JR. 49.95
FONT MASTER 14.95

TEKNIKA MJ10 MONITOR

$159

TEKNIKA RGB 13" MONITOR $269

- Color composite 13" monitor
- 1 year parts & labor
- Compatable with most home computers.



SHARP 13" COLOR COMPOSITE MONITORS

$159

SHARP 12" GREEN MONITOR 59.95

Monitor provides sharper picture to show case colorful graphics.

STAR SG10 PRINTER

205.95

- Tractor/Friction
- 130 cps.

STAR SG15 PRINTER 359.95

VIDEO TAPE RIOT

TDK T120
SCOTCH T120
JVC T120
PANASONIC T120
MIN. PURCHASE 10

YOUR CHOICE **4.39** EACH

NASHUA DISKETTES

BOX OF 10 **8.95**

- Double density
- Single sided.

ELEPHANT DISKETTES

BOX OF 10 **11.95**

Free Extra Disk Inside
Featuring Success with Math & Success With Algebra by CBS

SURGE PROTECTORS

19.99 & Up

6 outlet with lighted switch.

SURGE PLUS **34.95**

COMPETITION PRO 5000 JOY STICK

11.95 EA.

Arcade quality joy stick score like a pro!

SPECIAL SOFTWARE FOR THE 128

Data Manager	59.95
Swiftcalc with sideways	59.95
Word Writer with Spell Checker	59.95
Paper Clip	69.95
Consultant	64.95

CBS SOFTWARE FOR COMMODORE 64

Grand prize $10,000 cash for tuition. 1st. prize $1,000 educational software 2nd prize $100 each for school supplies Plus... with proof of purchase you will get $10 rebate on CBS software's Easy Key program.

Dr. Seuss Fix Up The Mix Up Puzzle	9.95
Many ways to say I Love You	9.95
Astro-grover	9.95
Big Bird's Funhouse	9.95
Ernie's Magic Shapes	24.95
Forcast	9.95
Dinosaur Dig	39.95
Coast to Coast	39.95
Success with Math Series	24.95
Success with Algebra Series	34.95
Muppet Learning Keys	79.95

WORD PROCESSING

Fleet system 2 w/70,000 word spellpak	50.00

MODEMS

Video 7	59.95
Mitey Mo (1 hour free compuserve time)	69.95
West Ridge	79.95

ACCESS SOFTWARE

Neutral Zone	29.95
Mach 5	29.95
Beach-Head II	29.95

TIMEWORKS

Data Manager II	49.95
Evelyn Wood Dynamic Work Writer with Spellcheck	49.95
Swiftcalc w/Sideways	49.95
Cave of the Word Wizards	34.95

EPYX SOFTWARE

Hot Wheels	19.95
Summer Games II	19.95
Fast Load	19.95
Barbie	19.95
Breakdance	19.95
Baseball	19.95
Pitstop II	19.95
Winter Games	19.95

INTERFACES

Tymac Connection	69.95
G-Wiz	49.95

DISKETTES

Nashua Diskettes 3½" DD/SS (box of 10)	27.95
Nashua (box of 10)DD/DS	12.95
Scotch (3M) (box of 10) DD/SS	10.95
Scotch Head Cleaner Kit	6.95

NIBBLE NOTCH

Turns your 5½" Single Disk into A 2 Sided Disk **7.95**

DISK FILES

10 Disk Holder	6.00
60 Disk Holder (Stackable)	9.95

MONITORS

Sharp amber 12"	69.95
Teknika RGB/Composite 13"	259.00

JOYSTICKS

Wico Boss	10.50
Wico Bat	18.00
Wico Threeway	21.00
Gim 1000-left/right firing button	9.95

PRINTERS

StarSG10 Tractor/Friction 130cps	259.00
JUKI 6100 Daisywheel letter quality Parallel	399.95
Serial	449.95
SG10-C w/built in Commodore interface	215.00
Legend 880	239.95
Legende 1080	269.95
Legende 1380	300.95
Legende 1385	379.95

PAPER & RIBBON

Delivery on paper included in price

paper size 9½"-11" 1000 x 3 boxes Microperf	49.95
Ribbon 802 M120/M150	9.95
Ribbon SG10/SG15/ Okidata 82A	2.95
Ribbon 1101	19.95

TO ORDER CALL OUTSIDE N.Y. **1-800-722-4002** **ORDER LINE!**

Check, Money Order, MC or VISA accepted call for shipping & handling information. NYS residents add applicable sales tax. Prices and availability are subject to change without notice. Air factory fresh merchandise with manufacturer's warranty. Dealers welcome. Call for recent price reductions & new rebate information. No returns without authorization. For information & customer service call 1-718-895-2388.

NEW! BIG 5 SOFTWARE BOUNTY BOB STRIKES BACK **CALL**

For use with both Atari & Commodore

NEW! MINDSCAPE INC. THE HALLEY PROJECT **CALL**

A mission to our solar system used with Atari & Commodore

MAIL ORDERS TO: WORLD TRADE, 2075 JERICHO TURNPIKE, NEW HYDE PARK, NEW YORK, 11040

The Talking Computer

Charles Brannon
Program Editor

Speech synthesis is fascinating. There's something gripping about a talking computer. Having used a computer, you begin to realize there's a whole world in there, but it has no name, no personality. When the computer talks, no matter how crudely, it somehow humanizes the machine. We already anthropomorphize things like our cars and pets. Adding a voice makes it all the more convincing.

More practically, speech helps bridge the communications gap between man and machine. The computer of the future will have sophisticated input devices. One day we'll be able to point to screen objects by looking at them, rather than pointing at them with some device or by moving a cursor on the screen. Tomorrow's computer may be able to understand speech, or, even better, lip-read. Indeed, some work is already in progress in these areas.

Eventually, our machines may be able to translate brain wave patterns into some usable form of input if we trust them to read our minds in even the most primitive fashion. But it's hard to imagine that speech will ever be outmoded as a practical form of communication. Although most of us can read faster than we can be read to, some form of intelligent speech will be built into most, if not all, future machines.

In fact, Commodore's Amiga has set a precedent by including voice synthesis as a standard. Programmers can use speech in their programs, confident that all users will be able to take advantage of it.

Affordable Speech

For a modest price, anyone can hook up a speech box and experiment with computer voice technology. Voice synthesizers have dropped in price as have so many other consumer computing products. Genesis Computer Corporation recently introduced the ProVoice, a $99 voice synthesizer for the Commodore 64 (or 128 in 64 mode). The ProVoice is a rather bulky cartridge that plugs into the expansion port (the cartridge doesn't seat very well, and tends to come unplugged). It adds voice synthesis commands to BASIC, making programming easier.

Hi-Tech Vernacular

The hallmark of the ProVoice is its excellent text-to-speech algorithms. With some synthesizers, you have to build up words from *phonemes*, the basic sounds of speech. Other synthesizers can only speak a limited memorized vocabulary. Still other synthesizers require you to record the sounds yourself with a microphone. Although ProVoice is a phoneme-based synthesizer, you need never program speech at such a low level (although the capability is available to you). Instead, the routines in the ProVoice cartridge translate ordinary English text into speech. It's as simple as entering SPEAK "HELLO" to get your computer talking.

The SPEAK command lets the ProVoice speak anything you can PRINT, including string and numeric variables. The speech is heard from a small speaker built into the ProVoice cartridge, separate from SID chip audio. The speech, like all phoneme-based synthesis, is robotic and monotonic, although you can insert pitch-change commands to simulate crude inflection. You also have control over nine volume levels.

Genesis claims a 95 percent accuracy rate for the text-to-speech algorithm, quite remarkable for a language as inconsistent as English. Of course, ProVoice can't tell the difference between *read* in the present tense ("reed") and *read* in the past tense ("red"). It follows English pronunciation rules as best it can, but it insists that *cough* rhymes with *bough*, and fails to realize that *house* rhymes with *mouse*. (*Mouse* comes out as "muss.") So, you sometimes need to intentionally misspell words, *photogruphy* for *photography*, or *scairce* for *scarce*. If you spell *fonetikly*, you can't go wrong.

Other commands (also programmed on the function keys) let you change the translation mode and toggle echo mode. The Conversational translation mode speaks most naturally. The Verbatim mode spells out symbols and pronounces control codes. The Character mode spells out everything, pronouncing words a letter at a time. You can also toggle a lowercase mode that causes ProVoice to either ignore shifted graphics or treat them as uppercase letters that should be pronounced.

The Echo mode is an especially handy feature. Anything printed to the screen is spoken in the current translation mode. ProVoice can read disk directories, data files, program listings, text from adventure games and utilities, even words spilling in from the modem. This is extremely useful for proofreading program listings—just have the computer read those tricky DATA statements to you. I even wrote a program to read *SpeedScript* files from disk.

If you need high-quality speech, phoneme-synthesis isn't ideal, but if you want the flexibility to be able to program any speech you like, there's no substitute.

ProVoice
Genesis Computer Corporation
P.O. Box 152
Hellertown, PA 18055
$99.95

GET YOUR EPYX BASEBALL OR EPYX FOOTBALL JERSEY

ONLY $8.95

DETAILS IN EVERY PACKAGE OF THESE SMASH SPORT SIMULATIONS

- Two Game Modes
- Statistics from 25 Famous Teams Included
- Build Your Own Line Up

- Call Your Own Plays
- Design Your Own Offensive and Defensive Plays — Or Use the Playbook

FOR THE C64™/128™

SUPER SPECIAL PRICE $24.95 EACH

CALL

EST. 1982

ComputAbility

800-558-0003

414-351-2007

YOUR C-64™/128™ ONE STOP SUPERSTORE

SEE ORDER DETAILS ON NEXT PAGE

WIN A FREE AMIGA COMPUTER FROM EPYX

COMPUTER SOFTWARE

SEE CONTEST ENTRY BLANKS IN EVERY PACKAGE OF THE

CLASSIC COMPUTER AGE ADVENTURE

- The Complete Temple of Apshai Trilogy: Temple of Apshai, The Upper Reaches and The Curse of Ra.
- 12 Levels, 568 Rooms with 37 Terrifying Monsters!
- All New Graphics, Enhanced Sounds and Faster Game Play!
- Classic Cast of Characters—The Innkeeper, The Dwarf, The Magic User and The Cleric, The Apshai Ant

FOR THE C64™/128™

SUPER SPECIAL PRICE $24.95 EACH

CALL

EST. 1982

ComputAbility

800-558-0003

414-351-2007

YOUR C-64™/128™ ONE STOP SUPERSTORE

SEE ORDER DETAILS ON NEXT PAGE

WIN A FREE TRIP TO SAN FRANCISCO AND TOUR THE LUCAS FILM STUDIOS

FOR CONTEST DETAILS SEE THE ENTRY BLANKS INSIDE EVERY LUCAS FILM PRODUCT FROM EPYX

COMPUTER SOFTWARE

- Realistic, Three-Dimensional Landscape. You're Piloting a Surface Rover Through the Rifts of the Legendary Planet Koronis

- Realistic, Three-Dimensional Caverns—Explore an Endless Enchanted Dimension

TM & © 1985 Lucasfilm Ltd. (LFL) All Rights Reserved. Epyx, Inc. Authorized User.

FOR THE C64™/128™

SUPER SPECIAL PRICE $24.95 EACH

CALL

EST. 1982

ComputAbility

800-558-0003

414-351-2007

YOUR C-64™/128™ ONE STOP SUPERSTORE

SEE ORDER DETAILS ON NEXT PAGE

WIN A FREE SKI WEEK FOR 4 AT BEAUTIFUL LAKE TAHOE

INCLUDING TRANSPORTATION, ACCOMMODATIONS, LIFT TICKETS, SKI AND CAR RENTAL, AND SPENDING MONEY AVAILABLE FROM EPYX

COMPUTER SOFTWARE

- Complete with Opening, Closing, and Awards Ceremonies, including National Anthems of 18 Different Countries

FOR THE C64™/128™

SUPER SPECIAL PRICE $24.95 EACH

CALL

EST. 1982

ComputAbility

800-558-0003

414-351-2007

YOUR C-64™/128™ ONE STOP SUPERSTORE

SEE ORDER DETAILS ON NEXT PAGE

It Talks!
It Recognizes!
It Writes Music!
and more . . .

UNITED STATES COMMODORE USERS GROUP ENDORSED

THE AMAZING VOICE MASTER®
Speech and Music Processor

Your computer can talk in your own voice. Not a synthesizer but a true digitizer that **records** your natural voice quality—and in any language or accent. Words and phrases can be expanded without limit from disk.

And it will understand what you say. A real word recognizer for groups of 32 words or phrases with unlimited expansion from disk memory. **Now you can have a two way conversation with your computer!**

Easy for the beginning programmer with new BASIC commands. Machine language programs and memory locations for the more experienced software author.

Exciting Music Bonus lets you hum or whistle to write and perform. Notes literally scroll by **as you hum!** Your composition can be edited, saved, and printed out. You don't have to know one note from another in order to write and compose!

Based upon new technologies invented by **COVOX**. One low price buys you the **complete system**—even a voice controlled black-jack game! In addition, you will receive a subscription to COVOX NEWS, a periodic newsletter about speech technology, applications, new products, up-dates, and user contributions. **You will never find a better value for your computer.**

ONLY $89.95 includes all hardware and software.

For telephone demonstration or additional information, call **(503) 342-1271.** FREE audio demo tape and brochure available.

Available from your dealer or by mail. When ordering by mail add $4.00 shipping and handling ($10.00 for foreign, $6.00 Canada).

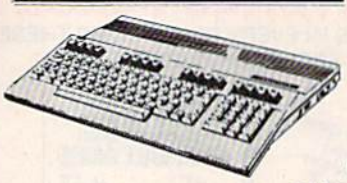
The Voice Master is available for the C64, C128, all Apple II's, and Atari 800, 800XL and 130XE. Specify model when ordering.

VISA MasterCard *For Faster Service on Credit Card Orders only:*

ORDER TOLL FREE 1-800-523-9230

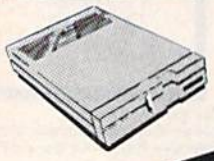
COVOX INC. (503) 342-1271
675-D Conger Street, Eugene, OR 97402
Telex 706017 (AV ALARM UD)

COMMODORE 128
PERSONAL COMPUTER



CALL FOR LATEST SUPER SPECIAL PRICE

COMMODORE C1571
DISK DRIVE

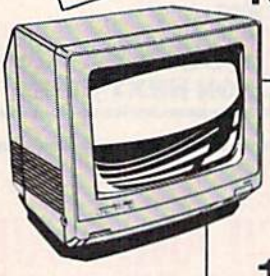


CALL FOR LATEST SUPER SPECIAL PRICE

THESE ITEMS ARE NOW IN STOCK!!! AT COMPUTABILITY

BUY BOTH THE C-128 & C1571 DISK DRIVE AND RECEIVE A **FREE $25.00** SOFTWARE GIFT CERTIFICATE

1902 MONITOR
ONLY $289



1670 MODEM
ONLY $169

1350 MOUSE
ONLY $42.95

EST. 1982

ComputAbility™

P.O. BOX 17882
MILWAUKEE, WI 53217

ORDER LINES OPEN
MON - FRI 11 A.M. - 7 P.M. CST
SAT 12 P.M. - 5 P.M. CST

TO ORDER CALL TOLL FREE
800-558-0003

FOR TECHNICAL INFORMATION, ORDER INQUIRIES, OR FOR WIS. ORDERS
414-351-2007

ORDERING INFORMATION FOR FAST DELIVERY SEND CASHIER'S CHECK MONEY ORDER OR DIRECT BANK TRANSFER. PERSONAL AND COMPANY CHECKS ALLOW 14 BUSINESS DAYS TO CLEAR. CHARGES FOR C.O.D. ARE $3.00. IN CONTINENTAL U.S.A. INCLUDE 4% SHIPPING ON ALL ORDERS, MINIMUM $4.00. MASTER CARD & VISA ORDERS PLEASE INCLUDE CARD #, EXPIRATION DATE, AND SIGNATURE. WI RESIDENTS PLEASE ADD 5% SALES TAX. HI., AK, FPO, APO, PUERTO RICO AND CANADIAN ORDERS PLEASE ADD MINIMUM 5% SHIPPING AND HANDLING, MINIMUM $5.00. ALL OTHER FOREIGN ORDERS PLEASE ADD MINIMUM 15% SHIPPING, MINIMUM $10.00. ALL GOODS ARE NEW AND INCLUDE FACTORY WARRANTY. DUE TO OUR LOW PRICES ALL SALES ARE FINAL. ALL DEFECTIVE RETURNS MUST HAVE A RETURN AUTHORIZATION NUMBER. PLEASE CALL 414-351-2007 TO OBTAIN AN RA# OR YOUR RETURN WILL **NOT** BE ACCEPTED FOR REPLACEMENT OR REPAIR. PRICES AND AVAILABILITY SUBJECT TO CHANGE WITHOUT NOTICE.

NOTE ON ALL ORDERS OUTSIDE CONTINENTAL U.S.A. WE SHIP ALL ORDERS FIRST CLASS INSURED U.S. MAIL. **IF SHIPPING CHARGES EXCEED THE MINIMUM AMOUNT** YOU WILL BE CHARGED THE ADDITIONAL AMOUNT TO GET YOUR PACKAGE TO YOU QUICKLY AND SAFELY.

MasterCard VISA

NO SURCHARGE ON CREDIT CARDS

COMMODORE 64

SUPER PRINTER PACKAGES
FOR C-64

SG 10 & G-Wiz	279
Panasonic 1091 & G-Wiz	308
Panasonic 1090 & G-Wiz	261
Legend 1080 & G-Wiz	282
Citoh 8510AP+ & G-Wiz	395

Super Printer packages have no extra charges added when shipped in Continental USA.

star micronics inc
THE POWER BEHIND THE PRINTED WORD.

SG-10	215	SD-15	449
SG-15	369	SR-10	Call
SD-10	339	SR-15	Call

MODEMS

Westridge AA/AD	57.95
Total Tele Modem	49.95
Mighty Mo	69.95
1660 Modem	49.95

INDUS GT
For C-64 ..... Call

PRINTER INTERFACES

Data Share	49.95
Cardco G+	49.95
G-Wiz	59.95

PRINTERS

Citoh 8510AP+	329	Toshiba 1340	559
Legend 1080	229	Legend 808	179
Citoh 7500AP	219	Panasonic 1090	199
Epson	Call	Panasonic 1091	245
Juki 5510	389	Powertype	309

Buy the Print Shop for 27.95 with the purchase of any printer.

PRINTER BUFFERS

Microfazer	Call
U-Print-16K Printer Buffer	79
U-Print-32K Printer Buffer	89
U-Print-64K Printer Buffer	99

Samsung Monitor Special

12 Inch Amber	79.95
12 Inch Green	79.95
14 Inch Color (.63 DOT)	159
14 Inch Color (.52 DOT)	179

Monitor Shipping $10.00

COMMODORE 64 SOFTWARE

ACCESS
Beachhead-D	21.95
Beachhead II-D	24.95
Raid Over Moscow-D	24.95
Mach V-Cart	21.95

BATTERIES INCLUDED
Super Buscard II	129.95
B.I. 80	109.95
Paperclip/Spellpak-D	79.95
Consultant-D	52.95
Cal-Kit-D	34.95
Home Pak-D	34.95
Home Organizer Items-D	16.95

BRODERBUND
Bank Street Writer-D	34.95
Dr. Creep-D	20.95
Bungling Bay-D	20.95
Spelunker-D	20.95
Music Shop-D	29.95
Print Shop-D	34.95
Karateka-D	20.95
Champ Loderunner-D	23.95
Print Shop Graphics-D	19.95
Print Shop Refill	16.95
Print Shop Graphics II-D	19.95

CBS SOFTWARE
Call for items and prices.

COMMODORE
Call for items and prices.

EPYX
Fast Load-Cart	25.95
Rescue on Fractalus-D	25.95
World's Greatest Football-D	25.95
The Eidolon-D	25.95
Winter Games	25.95
Summer Games II-D	25.95
Koronis Rift-D	25.95
Ballblazer-D	25.95

DATASOFT
Conan-D	27.95
Bruce Lee-D	27.95
Alternate Reality-D	27.95
Goonies-D	23.95
Elevator Action-D	23.95
Zorro-D	23.95
Pole Position II-D	23.95

FIRST STAR
Call for Items and Prices

INSTA (CIMMARON)
Insta-Calc/Graph Combo-D	24.95
Insta-Ledger-D	39.95
Insta-Speed-D	39.95
Insta-Writer-D	14.95
Management Combo-D	39.95

INFOCOM
Deadline-D	29.95
Enchanter-D	24.95
Infidel-D	29.95
Planetfall-D	24.95
Sorcerer-D	29.95
Starcross-D	29.95
Suspended-D	29.95
Witness-D	29.95
Sea Stalker-D	24.95
Zork I, II or III-D	27.95
Wisbringer-D	29.95

MICROPROSE
Silent Service-D	23.95
Gunship-D	23.95
Accrojet-D	23.95
F-15 Strike Eagle-D	23.95
Decision in Eagle-D	27.95
Kennedy Approach-D	23.95
Crusade in Europe-D	27.95

MINDSCAPE
Call for Items and Prices

AMIGA COMPUTER SOFTWARE AND HARDWARE
Call for stock and availability

C-128 Computer
1571 Disk Drive
1670 Modem
1902 RGBI Monitor
Call for stock and availability

SUPER SPECIAL PRICES EFFECTIVE NOW THRU DECEMBER 31, 1985

ELECTRONIC ARTS

Archon	16.95	Mail Order Monster	21.95
Mule	16.95	Racing Destruction Kit	21.95
Seven Cities of Gold	21.95	Archon II	21.95
Pinball Construction Kit	16.95	Adventure Construction Set	26.95
Music Construction Kit	16.95	Financial Cookbook	26.95
Skyfox	21.95	Movie Maker	24.95
One on One	21.95		

MISCELLANEOUS
Ultima III-D	37.95
Flight Simulator II-D	34.95
Castle Wolfenstein-D	20.95
Superbase 64-D	47.95
Strip Poker-D	23.95
Slap Shot Hockey-D	14.95
Mastertype-D	27.95
Beyond Wolfenstein-D	23.95
S.A.M.-D	41.95
Alien Voice Box	99.95
Sargon III-D	34.95
Ultima IV-D	41.95
Typing Tutor III-D	34.95
Koalaprinter-D	19.95
Ultima II-D	37.95
Blue Max-D	23.95
Blue Max 2001-D	23.95
Relax-D	79.95
Microleague Baseball-D	29.95
Stunt Flyer-D	19.95
Expedition Amazon-D	23.95
Xyphus-D	23.95
Transylvania-D	23.95
Halley Project-D	29.95
Bounty Bob-D	23.95
Fleet System II-D	44.95
Space Shuttle-D	20.95
Newsroom-D	34.95
Paper Airplane Kit-D	23.95
Chem Lab	27.95
Print Shop Graphics III-D	19.95

EST. 1982
ComputAbility™
P.O. Box 17882, Milwaukee, WI 53217
ORDER LINES OPEN
Mon-Fri 11 a.m. - 7 p.m. CST • Sat. 12 p.m. - 5 p.m. CST

To Order Call Toll Free
800-558-0003
For Technical Info, Order Inquiries, or for Wisc. Orders
414-351-2007

ORDERING INFORMATION: PLEASE **SPECIFY SYSTEM.** FOR FAST DELIVERY SEND CASHIER'S CHECK OR MONEY ORDER. PERSONAL AND COMPANY CHECKS ALLOW 14 BUSINESS DAYS TO CLEAR. SCHOOL P.O.'s WELCOME. **C.O.D. CHARGES ARE $3.00.** IN CONTINENTAL U.S.A. INCLUDE $3.00 FOR SOFTWARE ORDERS, 4% SHIPPING FOR HARDWARE, MIMIMUM $4.00. MASTER CARD AND VISA ORDERS PLEASE INCLUDE CARD #, EXPIRATION DATE AND SIGNATURE. WI RESIDENTS PLEASE INCLUDE 5% SALES TAX. HI, AK, FPO, APO, PUERTO RICO AND CANADIAN ORDERS, PLEASE ADD 5% SHIPPING. **MINIMUM $5.00.** ALL OTHER **FOREIGN ORDERS ADD 15% SHIPPING, MINIMUM $10.00.** ALL ORDERS SHIPPED OUTSIDE THE CONTINENTAL U.S.A. ARE SHIPPED FIRST CLASS INSURED U.S. MAIL. IF **FOREIGN** SHIPPING CHARGES EXCEED THE MINIMUM AMOUNT, YOU WILL BE CHARGED THE ADDITIONAL AMOUNT TO GET YOUR PACKAGE TO YOU QUICKLY AND SAFELY. ALL GOODS ARE NEW AND INCLUDE FACTORY WARRANTY. DUE TO OUR LOW PRICES ALL SALES ARE FINAL. **ALL DEFECTIVE RETURNS MUST HAVE A RETURN AUTHORIZATION NUMBER.** PLEASE CALL (414) 351-2007 TO OBTAIN AN R.A. # OR YOUR RETURN WILL NOT BE ACCEPTED. PRICES AND AVAILABILITY SUBJECT TO CHANGE WITHOUT NOTICE.

MISC. (cont.)
Ghostbusters-D	24.95
Batter-Up-D	29.95
Amer. Cross Country Race-D	20.95
Syncalc-D	34.95
Loderunner's Rescue-D	20.95
Mindwheel-D	27.95
Superbowl Sunday-D	24.95
Railroad Works-D	24.95
Vip Terminal-D	29.95
Compuserve Starter Kit	21.95
Reach For The Stars-D	29.95
Carriers At War-D	34.95
Compubridge-D	19.95
Grand Master Chess-D	19.95
Voice Messenger-D	44.95
Main Event Boxing-D	20.95
Crimson Crown-D	23.95
The Works-D	34.95
Perry Mason-D	22.95
Sherlock Holmes-D	23.95
Frank & Ernest ADV-D	23.95
Kobayashi Alternative-D	27.95
Hacker-D	20.95
Brimstone-D	27.95
Fast Tracks-D	23.95
Keys to Typing-D	19.95
The Hobbit-D	23.95
Cave of Time-D	23.95

MasterCard

VISA

No surcharge for MasterCard or Visa

MISC. (cont.)
Escape-D	23.95
Golden Oldies-D	19.95
Europe Ablaze-D	33.95
Trio-D	49.95
Animation Station-D	49.95
Karate Champ-D	25.95

SCARBOROUGH
Mastertype-D/Cart	27.95
Net Worth-D	49.95
Songwriter-D	27.95
Run for the Money-D	27.95
Figures and Formulas-D	20.95
Writing Wizard-D	49.95

SCHOLASTIC
Call for Items and Prices

SIMON AND SCHUSTER
Call for Items and Prices

SIERRA ON-LINE
Call for Items and Prices

ELECTRONIC ARTS
Archon-D	19.95
Archon II-D	24.95
Mule-D	19.95
Realm/Impossibility-D	19.95
Murder/Zinderneuf-D	19.95
Music Construction-D	19.95
Pinball Construction-D	19.95
Skyfox-D	24.95
One on One-D	24.95
Seven Cities of Gold-D	24.95
Mail Order Monsters-D	24.95
Racing Destruction-D	24.95
Adventure Construction-D	29.95
Financial Cookbook-D	29.95

SSI
50 Mission Crush-D	24.95
Battle/Normandy-D/T	24.95
Combat Leader-D	21.95
Computer Baseball-D	24.95
Cosmic Balance-D	24.95
Germany 1985-D	37.95
Professional Golf-D	24.95
Ringside Seat-D	24.95
Broadsides-D	24.95
Questron-D	24.95
Computer Quarterback-D	24.95
Field of Fire-D	24.95
Carrier Fgrce-D	37.95
Breakthrough/Ardennes-D	37.95
Computer Ambush-D	37.95
Kampfgruppe-D	37.95
Oper. Market Garden-D	32.95
Gemstone Warrior-D	21.95
Imperium Galactium-D	24.95
Phantasie-D	24.95
Batallion Commander-D	24.95
Fighter Command-D	37.95
Norway 1985-D	21.95
Wings of War-D	24.95
Mech Brigade-D	37.95

SYNAPSE
Call for Items and Prices

TIMEWORKS
Business Systems-D	39.95
Word Writer/Spell-D	34.95
Swiftcalc w/Sideways	34.95
Data Manager II-D	34.95
Sideways-D	20.95
Evelyn Wood-D	34.95
Sylvia Porter-D	34.95

GAMESTAR
Starleague Baseball-D/T	20.95
On-Field Football-D	20.95
On-Field Tennis-D	20.95
On-Track Racing-D	20.95

D-Disk T-Cassette Cart-Cartridge

computing for families

Is Programming Dead?

Fred D'Ignazio
Associate Editor

Fred D'Ignazio is an associate editor of COMPUTE! *and* COMPUTE!'s GAZETTE. *He is a regular commentator on public TV's "Educational Computing" and on "The New Tech Times," a public TV program on consumer electronics. Fred's latest book is* Computing Together: A Parents and Teachers Guide to Using Computers with Young Children *(COMPUTE! Publications, 1984, $12.95).*

The Education Of Fred D'Ignazio

If you've followed my GAZETTE columns over the last two years, you've seen how often I've changed my thinking. Many of these changes have come from seeing new computer products and from talking to computer industry leaders. But most of the changes have come from listening to my readers. I credit you readers with the spirit and substance of many of my best GAZETTE columns. Despite appearances, these columns aren't the work of a single person. Rather, they are the collective product of all the readers who've taken the time to write me a letter.

Process Not Product

Over the past two years, in several of my columns, I've said that programming is dead. After writing these columns I expected to get letters from angry programmers who would defend programming as a ticket to a better job or a key to computer literacy.

I was wrong. Dozens of readers have argued in favor of the *process* of programming, not the product. For them programming is a form of *thinking*. They think of programming as a language, like English or mathematics, that they can use to express their thoughts and ideas. As a language for thoughts and ideas, they've said, programming is hardly dead.

Legos And Logo

Sometime after I received these letters, I had the opportunity to talk with John Kemeny and Tom Kurtz, the co-inventors of BASIC, and Seymour Papert, the creator of Logo. "Is programming dead?" I asked them. "Emphatically not!" they answered. Kemeny and Kurtz pointed out that programming has been a vital part of the liberal arts curriculum at Dartmouth College for the last 20 years. And Papert took me downstairs from his MIT office into a basement workshop to watch children who were using Logo to control machines, creatures, and vehicles they had made out of Lego building toys. "Logo is far from dead," said Papert. "These children are bringing Logo out of the computer into the real world."

Chasing Bees And Watching Stars

Shortly after I saw the MIT children's Lego-Logo contraptions, I attended the Logo '85 Conference at MIT, and the World Conference on Computers in Education, in Norfolk, Virginia. I heard teachers from all over the world describe how they and their children, like Papert's kids, were using programming to discover, describe, and control the real world. For example, one Japanese teacher and his children chased bees across hillsides, drew lines with Magic Markers across the backs of leaves, and watched the stars at night, then returned to the classroom and wrote Logo procedures to describe these "wondersome mechanisms of nature."

Programming As An End In Itself

I once was very excited about programming. But maybe I was excited for the wrong reasons—especially since those reasons have all disappeared. I thought that programming was a means to an end, and that end was software—programs that ran.

Now I'm not so sure. *Maybe programming is something more than just a means to create programs.* Maybe programming really is a form of thinking. Maybe it is an emerging medium for understanding and managing our machines, technology, and ever more complex world. If this is true, then we need to place a new emphasis on learning programming—this time for reasons that will endure the swift advances in computer technology.

What do *you* think? Please write me c/o *COMPUTE!'s Gazette, P. O. Box 5406, Greensboro, NC 27403.*

COMPUTER ROAD ATLAS

TAKE TRIPS WITH COMPUTER LISTINGS SHOWING THE BEST ROUTE

Enter the departing city and the destination city. **ROADSEARCH** computes and prints the shortest route.

ROADSEARCH contains 406 cities/road junctions and 70,000 road miles. **ROADSEARCH-PLUS** (extra cost) also contains a **ROADMAP DEVELOPMENT SYSTEM** which lets you customize your roadmap with up to 50 towns/road junctions anywhere in North America.

EASY TO USE. Back-up copies allowed. Specify Commodore-64/disk or Apple II. **15 DAY MONEY-BACK GUARANTEE.**

ROADSEARCH-PLUS is $74.95 and **ROADSEARCH** is only $34.95. MD residents add 5% state tax. Ask your dealer or:

— — — MAIL COUPON OR CALL TODAY — — —

Columbia Software (301) 997-3100
Box 2235E, Columbia, MD 21045

Please send me:

( )**ROADSEARCH-PLUS** for $74.95 for ( )Apple II/IIe/IIc
( )**ROADSEARCH** for $34.95 ( )C-64 disk

Add $1.50 shipping. If I am not satisfied, I may return it for a full refund.

( ) check ( ) Master Charge ( ) VISA

Card Number Expiration Date

Name

Address

City/State/Zip

ORDERS: 1-800-835-2246, EXT. 172

machine language for beginners

Richard Mansfield
Senior Editor

What is machine language? I've seen 01001100 (in a textbook); 255,001,175 (in your magazine); 10 JSR 65484 (in your column).

These are different ways of representing ML. There are other ways you might see it printed too: 10 DATA 255,1,175 or 8000 20 D2 FF or 8000 JSR $FFD2.

At first it seems like an impossible mess, but it's really simple: All these listings are just different ways of saying the same thing. It's like any other language: Things can be said in a variety of ways.

For People Who Don't Know ML

You don't need to learn about most of these different representations. Two of them just make it easier for people who don't know ML to type in ML programs. They are for the convenience of magazine or book readers and aren't really an aspect of machine language.

The numbers 255,001,175 are a fragment of a listing which tells COMPUTE!'s "MLX" program how to generate a runnable ML program. MLX is our ML typing utility. It checks each line as it is entered and reports any errors. Similarly, ML can be listed in magazines as a series of DATA statements. This kind of listing is called a *BASIC loader* and a little loop in the loader POKEs each number into RAM when the loader is run, thus creating a finished ML program without the typist needing to understand anything about ML.

Other forms of "pseudo ML" are for studying; they're the equivalent of a program listing in BASIC. ML in the form of 8000 20 D2 FF or 8000 JSR $FFD2 appears on screen or on your printer when you use a special program called a *disassembler*. You give starting and ending addresses to a disassembler (since ML can start anywhere in RAM, you need to specify what part of memory you want disassembled).

Then the disassembler will print out the individual bytes of the program and their translation into ML *mnemonics* (instructions). It's usually a combination of bytes and translated instructions and looks like this: 8000 20 D2 FF JSR $FFD2. There are no line numbers here, but the address in RAM of this instruction serves much the same purpose: 8000. Then we have the three-byte package making up the instruction JSR with its *argument* $FFD2.

But what kind of numbers are D2 and FF? They're called *hexadecimal* or *hex*, symbolized by the $ sign. It's probably wise to start learning ML without worrying about hex. In some ways, hex is more convenient to use for advanced ML programming. But it's not for beginners and you can do anything you want in ML using ordinary decimal numbers. Likewise, that 01001100 you found in a textbook is yet another number system. It's called *binary*. Best not worry about that either until you're pretty well along in your understanding of ML. It, too, is always optional.

So, what is the real ML? How do you create an ML program? There are two stages: the code you write (source code) and the code the machine reads (object code). To understand this, it's helpful to realize that BASIC is also created in two stages: the code you write, like the instruction PRINT, and the code that ends up in RAM as your program, the runnable object code the computer can read and understand and act upon.

When you type 10 PRINT and press RETURN, your computer immediately transforms your source code (10 PRINT) into the numbers 10 0 153. The 10 0 is the line number, the 153 is the "token" (the symbol) for the instruction PRINT. Every BASIC command has its token and every line of BASIC you type in is automatically transformed from your human-readable source code into the machine-readable, tokenized, BASIC object code. Source code is easy to type in and easy to understand when it's LISTed. Object code is more compact and it's all numbers, the way the computer likes things.

The VIC and 64 are controlled by BASIC; it grabs control when you turn on the computer, and it lurks in the background no matter what you do. That's why you normally don't notice the two stages of writing a BASIC program—the object code is generated as soon as you press RETURN on each line. If they'd designed our computers to be governed by ML, things could work the same way: You could type in each line of ML source code and it could be translated (*assembled* is the technical term) into ML object code immediately.

As things are, you need to use an *assembler* to translate your ML source code into object code. In ML, two stages of creating a program are visible to the programmer. First you type in 10 JSR 65490 and any additional lines you want to include in the source code. Then, you activate your assembler. You have to obtain an assembler program; it's not built into a VIC or 64. The assembler creates the object code by reading through the entire source code and transforming each command into the appropriate ML object code.

Note that we used decimal in the example line above ($FFD2 would be that same number in hex). Unfortunately, some primitive assemblers offer you no choice: You must write your source code using hex. The more powerful and sophisticated assemblers, however, let you use either hex or decimal. That, and other programmer-friendly features, makes them more suitable for beginners to learn with.

COMMODORE 64 COMPUTER

(Order Now)

$139.95

- C128 Disks 79¢ ea.*
- Commodore Graphics Printer $99.95
- 13" Zenith Color Monitor $139.95

CALL BEFORE YOU ORDER

COMMODORE 64 SYSTEM SALE

LTD. QTY.

Deal 1	Deal 2
Commodore 64	Commodore 64
Com. 1541 Disk Drive	Com. 1541 Disk Drive
Com. 803 Printer	13" Zenith Color Monitor
$407	$457

PLUS FREE $49.95 Oil Barons Adventure Program

C128 COMMODORE COMPUTER

NEW

(Order Now)

$289.95

Less $30 FREE Software, your choice from our catalog (See Catalog Page 13)

- 340K 1571 Disk Drive $259.00
- Voice Synthesizer $39.95
- 12" Amber Monitor $59.95

PRICES MAY BE LOWER

COMMODORE 64 COMPUTER $139.95

You pay only $139.95 when you order the powerful 84K COMMODORE 64 COMPUTER! LESS the value of the SPECIAL SOFTWARE DISCOUNT COUPON we pack with your computer that allows you to SAVE OVER $250 off software sale prices!! With only $100 of savings applied, your net computer cost is $39.95!!

* C128 DOUBLE SIDED DISKS 79¢ EA.

Get these 5¼" Double Sided Floppy Disks specially designed for the Commodore 128 Computer (1571 Disk Drive). 100% Certified. ***Lifetime Warranty***. Automatic Lint Cleaning Liner included. 1 Box of 10 - $9.90 (99¢ ea.). 5 Boxes of 10 - $44.50 (89¢ ea.). 10 Boxes of 10 - $79.00 (79¢ ea.).

13" ZENITH COLOR MONITOR $139.95

You pay only $139.95 when you order this 13" ZENITH COLOR MONITOR. LESS the value of the SPECIAL SOFTWARE DISCOUNT COUPON we pack with your monitor that allows you to save over $250 off software sale prices!! With only $100 of savings applied, your net color monitor cost is only $39.95. (16 Colors).

80 COLUMN COMMODORE GRAPHICS PRINTER $99.95

You pay only $99.95 when you order the 803 Commodore Graphics Printer. 60 CPS, Dot Matrix, Bi-Directional. Prints 8½" full size paper. Plug in direct interface included! LESS the value of the SPECIAL SOFTWARE DISCOUNT COUPON we pack with your printer that allows you to SAVE OVER $250 off software sale prices!! With only $100 of savings applied your net printer cost is ZERO!

4 SLOT EXPANDER & 80 COLUMN BOARD $59.95

Now you program 80 COLUMNS on the screen at one time! Converts your Commodore 64 to 80 COLUMNS when you plug in the 80 COLUMN EXPANSION BOARD!! PLUS 4 slot expander!

80 COLUMNS IN COLOR PAPERBACK WRITER 64 WORD PROCESSOR $39.95

This PAPERBACK WRITER 64 WORD PROCESSOR is the finest available for the COMMODORE 64 computer! The ULTIMATE FOR PROFESSIONAL Word Processing. DISPLAYS 40 or 80 COLUMNS IN COLOR or black and white! Simple to operate, powerful text editing, complete cursor and insert delete key controls line and paragraph insertion, automatic deletion, centering, margin settings and output to all printers! List $99.00. **SALE $39.95.** Coupon $29.95.

SPECIAL SOFTWARE COUPON

We pack a SPECIAL SOFTWARE DISCOUNT COUPON with every COMMODORE 64 COMPUTER, DISK DRIVE, PRINTER, or MONITOR we sell! This coupon allows you to SAVE OVER $250 OFF SALE PRICES!!

(Examples)

PROFESSIONAL SOFTWARE COMMODORE 64

Name	List	Sale	Coupon
Paperback Writer 64	$99.00	$39.95	$29.95
Paperback Database 64	$69.00	$34.95	$24.95
Paperback Dictionary	$24.95	$14.95	$10.00
The Print Shop	$44.95	$27.95	$26.95
Halley's Project	$39.95	$25.95	$24.95
Practicalc (spread sheet)	$59.95	$19.95	$14.95
Programmers Reference Guide	$24.95	$16.95	$12.50
Nine Princes in Amber	$32.95	$24.95	$21.95
Super Bowl Sunday	$30.00	$19.95	$17.95
Flip & File Disk Filer	$24.95	$14.95	$12.95
Deluxe Tape Cassete (plus FREE game)	$89.00	$44.95	$34.95
Pro Joystick	$19.95	$12.95	$10.00
Computer Care Kit	$44.95	$29.95	$24.95
Dust Cover	$ 8.95	$ 6.95	$ 4.60
Injured Engine	$39.95	$27.95	$24.95
Pitstop II (Epyx)	$39.95	$22.95	$19.95
Music Calc	$59.95	$14.95	$12.95
File Writer (by Codewriter)	$39.95	$29.95	$24.95

(See over 100 coupon items in our catalog)

Write or call for Sample SPECIAL SOFTWARE COUPON!

ATTENTION

Computer Clubs

We Offer Big Volume Discounts

CALL TODAY!

PROTECTO WARRANTY

All Protecto's products carry a minimum 90 day warranty. If anything fails within 90 days from the date of purchase, simply send your product to us via United Parcel Service prepaid. We will IMMEDIATELY send you a replacement at no charge via United Parcel Service prepaid. This warranty proves once again that ***We Love Our Customers.***

C128 COMMODORE COMPUTER $289.95

We expect a limited supply for Christmas. We will ship on a first order basis. This all-new revolutionary 128K computer uses all Commodore 64 software and accessories plus all CPM programs formatted for the disk drive. ***Less $30 FREE Software, your choice from our catalog (See Catalog Page 13)***
List $349.00. **SALE $289.95.**

340K 1571 COMMODORE DISK DRIVE $259.00

Double Sided, Single Disk Drive for C-128 allows you to use C-128 mode plus CPM mode. 17 times faster than 1541, plus runs all 1541 formats.
List $349.00. **Sale $259.00.**

SUPER AUTO DIAL MODEM $37.95

Easy to use. Just plug into your Commodore 64 computer and you're ready to transmit and receive messages. Easier to use than dialing your telephone, just push one key on your computer! Includes exclusive easy to use program for up and down loading to printer and disk drives. ***Best in U.S.A.***
List $129.00. **SALE $37.95.**

VOICE SYNTHESIZER $39.95

For Commodore-64 computers. Just plug it in and you can program words and sentences, adjust volume and pitch, make talking adventure games, sound action games and customized talkies!! FOR ONLY $19.95 you can add TEXT TO SPEECH, just type a word and hear your computer talk — ADD SOUND TO "ZORK", SCOTT ADAMS AND OTHER ADVENTURE GAMES!!
(Disk or tape.) List $89.00. **SALE $39.95**

12" AMBER MONITOR $59.95

Your choice of green or amber screen monitor, top quality, 80 columns x 24 lines, easy to read, anti-glare! PLUS $9.95 for connecting cable, Com-64 or VIC-20. List $159.00. **SALE $59.95.**

PRINTER/TYPEWRITER COMBINATION $249.95

"JUKI" Superb letter quality, daisy wheel printer/typewriter combination. Two machines in one — just a flick of the switch. 12" extra large carriage, typewriter keyboard, automatic margin control and relocate key, drop in cassette ribbon! (90 day warranty) centronics parallel or RS232 serial port built in (Specify). List $349.00. **SALE $249.95. (Ltd. Qty.)**

13" RGB & COMPOSITE COLOR MONITOR $259.95

Must be used to get 80 columns in color with 80 column computers (C128 - Atari ST - IBM - Apple).
(Add $14.50 shipping)
List $399.00. **SALE $259.95.**

- LOWEST PRICES • 15 DAY FREE TRIAL
- BEST SERVICE IN U.S.A. • ONE DAY EXPRESS MAIL

PHONE ORDERS
8 a.m. - 8 p.m. Weekdays
9 a.m. - 12 noon Saturdays

- 90 DAY FREE REPLACEMENT WARRANTY
- OVER 500 PROGRAMS • FREE CATALOGS

Add $10.00 for shipping, handling and insurance. Illinois residents please add 6% tax. Add $20.00 for CANADA, PUERTO RICO, HAWAII, ALASKA, APO-FPO orders. Canadian orders must be in U.S. dollars. WE DO NOT EXPORT TO OTHER COUNTRIES EXCEPT CANADA.
Enclose Cashiers Check, Money Order or Personal Check. Allow 14 days for delivery. 2 to 7 days for phone orders. 1 day express mail!
VISA MASTER CARD C.O.D. No C.O.D. to Canada, APO-FPO

PROTECTO

We Love Our Customers

Box 550, Barrington, Illinois 60010

312/382-5244 to order

GIANT PRINTER SALE!!

List $399.00 **10" Printer**

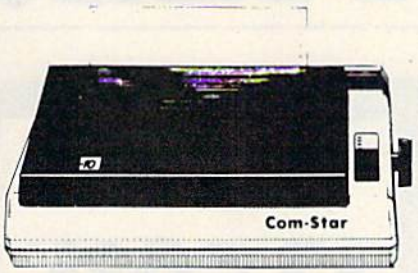
SALE **$179.00** SALE

10" Comstar 10X — This Bi-directional Tractor/Friction Printer prints standard sheet 8½"x11" paper and continuous forms or labels. High resolution bit image graphics, underlining, horizontal tab setting, true lower descenders, with super scripts and subscripts, prints standard pica, compressed, expanded, block graphics, etc. Fantastic value. (Centronics parallel interface.)
List $399.00. **Sale $179.00.**

1 Year Warranty

120-140 CPS

Premium Quality



List $599.00 **15½" Printer**

SALE **$239.00** SALE

15½" Comstar 15X — Has all the features of the 10" Comstar 10X plus a wider 15½" carriage and more powerful electronics to handle large ledger business forms! (Better than FX-100). The 15½" Comstar 15X also prints on standard size paper and continuous forms and labels. Fantastic value. (Centronics parallel interface.)
List $599.00. **Sale $239.00.**

List $499.00 **10" Printer**

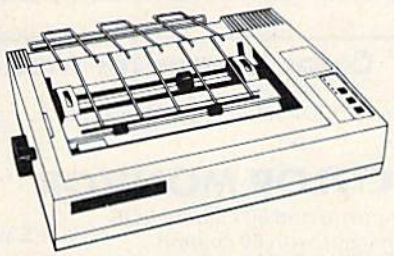
SALE **$229.00** SALE

10" Comstar 160+ High Speed — This Bi-directional Tractor/Friction Printer combines the above features of the 10" Comstar 10X with speed (150-170 cps) and durability. Plus you get a 2K buffer, 96 user definable characters, super density bit image graphics, and square print pins for clearer, more legible print (near letter quality). This is the best value for a rugged dependable printer. (Centronics parallel interface.)
List $499.00. **Sale $229.00.**

1 Year Warranty

150-170 CPS

High Speed



List $699.00 **15½" Printer**

SALE **$289.00** SALE

15½" Comstar 160+ High Speed — This Bi-directional Tractor/Friction Printer has all the features of the 10" Comstar 160+ High Speed plus a wider 15½" carriage and the heavy duty electronics required for today's business loads. You can use large ledger business forms as well as standard sheets and continuous forms and labels. This is the best wide carriage printer in the U.S.A. (Centronics parallel interface.)
List $699.00. **Sale $289.00.**

List $599.00 **10" Printer**

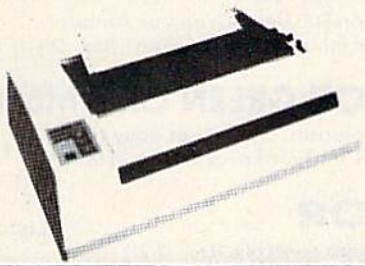
SALE **$259.00** SALE

10" Comstar 2000 — The ultimate printer has arrived! This Bi-directional Tractor/Friction Printer gives you all the features of the Comstar 160 plus higher speed (165-185 cps), 256 downloadable characters, proportional setting, external dark printing mode and a *lifetime printhead warranty. **PLUS** ...

*Lifetime warranty**

165-185 CPS

High Speed & Letter Quality



List $599.00 **10" Printer**

SALE **$259.00** SALE

With the flip of a switch you can go into the letter quality mode which makes all your printing look like it came off a typewriter. Turn in term papers, do articles or just print programs. Have the best of letter quality and speed in one package. Fantastic printer (Centronics parallel interface.)
List $599.00. **Sale $259.00.**

• ***15 Day Free Trial — 1 Year Immediate Replacement Warranty***

Parallel Interfaces

Commodore-64, VIC 20 — $39.00 Atari — $59.00 Apple II, II+, IIe — $59.00

Add $10.00 ($14.50 for 15½" Printers) for shipping, handling and insurance. Illinois residents please add 6% tax. Add $20.00 for CANADA, PUERTO RICO, HAWAII, ALASKA, APO-FPO orders. Canadian orders must be in U.S. dollars. WE DO NOT EXPORT TO OTHER COUNTRIES, EXCEPT CANADA.

Enclose Cashiers Check, Money Order or Personal Check. Allow 14 days for delivery, 2 to 7 days for phone orders, 1 day express mail!

VISA — MASTER CARD — C.O.D. No C.O.D. to Canada, APO-FPO.

PROTECTO

We Love Our Customers

22292 N. Pepper Rd., Barrington, Illinois 60010

312/382-5244 to order

COLOR MONITOR SALE!!!

Sale

16 COLORS

(Premium Quality)

- **Built in Speaker and Audio**
- **Front Panel Controls**
- **For Video Recorders**
- **For Small Business Computers**
- **Apple - Commodore - Atari - Franklin - etc.**

(Premium Quality)

- **Beautiful Color Contrast**
- **High Resolution**
- **Separated Video**
- **Sharp Clear Text**
- **Anti-Glare Screen**
- **40 Columns x 24 Lines**
- **Supports 80 Columns**

Requires special $19.95 C-128 cable.

List $329.00

RGB

IBM, C-128, Apple, Atari ST

13" Color Computer Monitor

*C64/C128 connecting cable $9.95

Sale $159.95*

Add $14.50 Shipping

13" RGB & COMPOSITE COLOR MONITOR

Allows use of C-128 and C64 mode - composite and 80 column RGB mode. Must be used to get 80 columns in color with 80 column computers (IBM, C-128, Apple & Atari ST). (add $14.50 shipping)

List $399.00 **Sale $259.95***

* C128 RGB cable $19.95

13" ZENITH COLOR MONITOR

(add $14.50 shipping)

List $299.00 **Sale $149.95***

15 Day Free Trial - 90 Day Immediate Replacement Warranty

12" XTRON SUPER HI-RESOLUTION MONITOR

80 Columns x 24 Lines, Super Hi-Resolution 800 lines Green or Amber Super-Clear "Easy to Read" text with special anti-glare screen! *(Ltd. Qty.)* List $249.00 **Sale $109.95***

12" ZENITH HI-RESOLUTION GREEN OR AMBER TEXT DISPLAY MONITOR

80 Columns x 24 Lines, Hi-Resolution, crisp clear easy to read text with anti-glare screen! A MUST for word processing. *(Ltd. Qty.)* List $199.00 **Sale $89.95***

12" AMBER MONITOR

80 Columns x 24 Lines, easy to read up front controls *(Ltd. Qty.)*

List $159.00 **Sale $59.95***

* C64/C128 connecting cable $9.95

• LOWEST PRICES • BEST SERVICE IN U.S.A. • ONE DAY EXPRESS MAIL • OVER 500 PROGRAMS • FREE CATALOGS

Add $10.00 for shipping, handling and insurance. Illinois residents please add 6% tax. Add $20.00 for CANADA, PUERTO RICO, HAWAII, ALASKA, APO-FPO orders. Canadian orders must be in U.S. dollars. WE DO NOT EXPORT TO OTHER COUNTRIES, EXCEPT CANADA.

Enclose Cashiers Check, Money Order or Personal Check. Allow 14 days for delivery. 2 to 7 days for phone orders. 1 day express mail!

VISA MASTER CARD C.O.D.

No C.O.D. to Canada, APO-FPO.

PROTECTO

We Love Our Customers

22292 N. Pepper Rd., Barrington, Illinois 60010

312/382-5244 to order

FLOPPY DISKS SALE *59¢ ea.

Economy Model or C-128 Cadillac Quality

We have the lowest prices!

***ECONOMY DISKS** For use with Commodore 64, Atari, Apple.

Good quality 5¼" single sided double density with hub rings.

Bulk Pac	100 Qty.	59¢ ea.	Total Price	$59.00
Box w/ sleeves	10 Qty.	79¢ ea.	Total Price	7.90

☆ C-128 Computer Disks ☆

CADILLAC QUALITY (Double Sided, Double Density) ***Specifically designed for use with C-128***

• Each disk certified • Free replacement lifetime warranty • Automatic dust remover • Works with IBM PC

For those who want cadillac quality we have the C-128 Floppy Disk. Used by professionals because they can rely on C-128 Disks to store important data and programs without fear of loss! Each C-128 disk is 100% certified (an exclusive process) plus each disk carries an exclusive FREE REPLACEMENT LIFETIME WARRANTY. With C-128 disks you can have the peace of mind without the frustration of program loss after hours spent in program development.

100% CERTIFICATION TEST

Some floppy disk manufactures only sample test on a batch basis the disks they sell, and then claim they are certified. Each C-128 disk is individually checked so you will never experience data or program loss during your lifetime!

FREE REPLACEMENT LIFETIME WARRANTY

We are so sure of C-128 Disks that we give you a free replacement warranty against failure to perform due to faulty materials or workmanship for as long as you own your C-128 disk.

AUTOMATIC DUST REMOVER

Just like a record needle, disk drive heads must travel hundreds of miles over disk surfaces. Unlike other floppy disks the C-128 smooth surface finish saves disk drive head wear during the life of the disk. (A rough surface will grind your disk drive head like sandpaper). The lint free automatic CLEANING LINER makes sure the disk-killers (dust & dirt) are being constantly cleaned while the disk is being operated.

C-128 Disks are definitely the Cadillac disk in the world

Just to prove it even further, we are offering these super LOW INTRODUCTORY PRICES

1 Box of 10 — $9.90 (99¢ ea.) 5 Boxes of 10 — $44.50 (89¢ ea.) 10 Boxes of 10 — $79.00 (79¢ ea.)

All disks come with hub rings and sleeves in an attractive package.

DISK DRIVE CLEANER $19.95

Everyone Needs A Disk Drive Doctor

FACTS

- 60% of all drive downtime is directly related to poorly maintained drives.
- Drives should be cleaned each week regardless of use.
- Drives are sensitive to smoke, dust & all micro particles.
- Systematic operator performed maintenance is the best way of ensuring error free use of your computer system.

NEW RSI-SMARTCARE HEAD CLEANING KIT WITH FREE LIBRARY CASE!

Improper maintenance can cause costly read/write errors on your disk drive. Regular cleaning of heads is essential for maintaining high quality operation and eliminating expensive downtime and repairs. The RSI-Smartcare Dry Process Head Cleaning Kit provides proper maintenance without the mess. Simply insert the cleaning disk into the drive and activate for 30 seconds. This kit contains 1-open ended disk jacket and 2 cleaning pads, good for a total of 30 cleanings. Applicable for both single and double sided drives.

List $29.95. **Sale $19.95.** *Coupon $12.95.*

RSI-COMPLETE PERSONAL COMPUTER CARE KIT!

The RSI Complete Personal Computer Care Kit contains everything you need to properly maintain your computer system. This easy to use kit makes necessary computer care quick and inexpensive. In one convenient package you will get all the necessary products: 5¼" Dry Process Head Cleaning Disk (Good for 15 thorough cleanings); Anti-Static Spray (Eliminates static build-up. For use on carpets, clothes, paper, glass, hard surfaces, and other material); Screen-Terminal Cleaner (Removes smoke, dust, and other contaminants on computer screens and keyboards); Lint-Free Cloths (Non-scratch, non-abrasive, used for cleaning and applying sprays to computers); Foam-Covered Swabs (use to clean those hard to reach places such as keyboards, etc.). GREAT VALUE FOR THE MONEY!! List $44.95. **Sale $29.95.** *Coupon $24.95.*

Add $3.00 for shipping, handling and insurance. Illinois residents please add 6% tax. Add $6.00 for CANADA, PUERTO RICO, HAWAII, ALASKA, APO-FPO orders. Canadian orders must be in U.S. dollars. WE DO NOT EXPORT TO OTHER COUNTRIES, EXCEPT CANADA.

Enclose Cashiers Check, Money Order or Personal Check. Allow 14 days for delivery, 2 to 7 days for phone orders, 1 day express mail!

VISA — MASTER CARD — C.O.D.

No C.O.D. to Canada, APO-FPO.

PROTECTO

We Love Our Customers

22292 N. Pepper Rd., Barrington, Illinois 60010

312/382-5244 to order

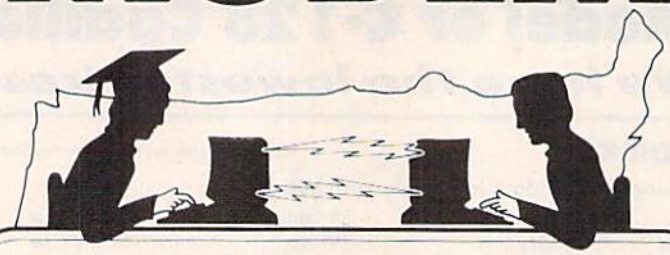
Commodore 64

MODEM

Commodore 64

Sale

SAVE



List $99.00

Sale $37.95

Coupon $32.95

Telecommunications

Lowest Price In the U.S.A.

List $99.00

Sale $37.95

Coupon $32.95

FOR CHILDREN · ADULTS · BUSINESS

Complete Auto Dial Telecommunications Package

"The only telecommunications package you will ever need."

(Exclusive Easy To Use Features)

FREE VIEWTRON DATABASE MEMBERSHIP

• Only Good Color Graphic Database Service in the U.S.A. (C-64)

Viewtron Software Plus First Hour FREE (See the Protecto Software Catalog On-Line) $9.95 value

---

• 300 Baud Modem • Auto Dial • Auto Answer • Upload & Download

Reach Out and Access Someone

- Educational courses
- Financial Information
- Banking at Home
- Popular Games
- News Updates and Information
- Electronic Shopping
- Research and Reference Materials

The Complete Telecommunications Package offers you all this plus ...

- Auto Log-on
- Dialing from Keyboard
- On-line Clock
- Capture and Display High Resolution Characters
- Download Text, Program or Data Files
- Stores on Disk Downloaded Files
- Reads Files from Disk and Uploads Text or Program Files
- Select Any Protocol (access almost any computer or modem)
- Plus Much, Much More

List $99.00 **Sale $37.95** Coupon $32.95

We are so sure this is the only telecommunications package you will need we will give you 15 days Free Trial.

Viewtron Membership sold separately — $9.95.

Add $3.00 for shipping, handling and insurance. Illinois residents please add 6% tax. Add $6.00 for CANADA, PUERTO RICO, HAWAII, ALASKA, APO-FPO orders. Canadian orders must be in U.S. dollars. WE DO NOT EXPORT TO OTHER COUNTRIES, EXCEPT CANADA.

Enclose Cashiers Check, Money Order or Personal Check. Allow 14 days for delivery. 2 to 7 days for phone orders. 1 day express mail!

VISA — MASTER CARD — C.O.D.

No C.O.D. to Canada, APO-FPO.

PROTECTO

We Love Our Customers

22292 N. Pepper Rd., Barrington, Illinois 60010

312/382-5244 to order

☆☆ NEW ☆☆ **Commodore - 64** ☆☆ NEW ☆☆

WORD PROCESSING BREAKTHROUGH!

SALE SALE

40 or 80 Columns in Color

Paperback Writer 64

40 or 80 Columns in Color

This is the easiest to use and most powerful word processor available for the Commodore 64. As you type on the screen, you will see your letters and words appear on the screen exactly as they will be printed (i.e. Italics will be *Italic*, Bold Face will be **Bold Face**). With the printer files you can customize Paperback Writer 64 to use all the fancy features of your printer. Loads EZ Script®, Paperclip®, & Wordpro 64® Files so you can easily upgrade your past wordprocessing text that you've written with obsolete wordprocessors. Take a look at some of the other features:

- **Wordwrap** — No Words Break At The Edge Of The Screen.
- **Flexible Cursor Movement,** Including Tabs And Other Timesavers.
- **Deletion And Insertion** Of Characters, Lines And Blocks Of Text.
- **On-screen Text Enhancement**, Such As Bold Face, Italics, Underlining, Superscripts And Subscripts, And Foreign And Other Characters.
- **Manipulation Of Blocks (ranges)** Of Text For Functions Such As Moving And Deleting, Even Between Files.
- **Sorting Lists** In Order Of Numbers And Letters.
- **Aligning And Adding Numbers** In Columns, Helpful With Tables.
- **Variable Margins** At Left And Right, And Paragraph Indentation.
- **Lines Centered, Justified** Or **Aligned** At The Right Side.
- **Variable Page Lengths** And **Line Spacing.**
- **Borders** At Top Or Bottom With Optional Title Lines And Page Numbers.
- **Linked Files** To Print Extra-long Documents In Sequence.
- **Flexible Printer Set-up** To Allow Use With Any Printer.
- **Find And Replace** Text Functions That Can Be Automatic.
- Complete Or Selective **Directories** Of Files On The Disk.
- **Sequential Files** For Mail Lists And Communication With Other Computers.
- **Spelling Checker**, Checks Your Spelling.

INTRODUCTORY PRICE

$39.95 SALE PRICE

Coupon Price $29.95

☆☆☆ Plus ☆☆☆

Full help screens on line with additional help on the disks mean you don't even need a manual. If you're in the middle of a page and you want to know how to use a special function just hit F7 and the information will appear before your eyes. If you still don't understand hit F7 again and a more detailed explanation appears. Then simply hit F8 and you're back in the letter where you left off. No manual lookup necessary. This is the easiest word processor in the world to use. List $99.00.
Introductory Sale Price $39.95. *Coupon $29.95.*

DOUBLE PROTECTO FREE TRIAL
We are so sure this is the easiest and most powerful word processor available, we will give you 30 days to try it out. If you are not completely satisfied, we will refund your purchase price.

PAPERBACK DATABASE (Datafax) List $69.00. **Sale $34.95.** * *Coupon $24.95.*
PAPERBACK DICTIONARY List $29.95. **Sale $14.95.** * *Coupon $10.00.*

Add $3.00 for shipping, handling and insurance. Illinois residents please add 6% tax. Add $6.00 for CANADA, PUERTO RICO, HAWAII, ALASKA, APO-FPO orders. Canadian orders must be in U.S. dollars. WE DO NOT EXPORT TO OTHER COUNTRIES EXCEPT CANADA.
Enclose Cashiers Check, Money Order or Personal Check. Allow 14 days for delivery, 2 to 7 days for phone orders, 1 day express mail!
VISA — MASTER CARD — C.O.D.
No C.O.D. to Canada, APO-FPO

PROTECTO
We Love Our Customers
22292 N. Pepper Rd., Barrington, Illinois 60010
312/382-5244 to order

EZ Script ® is a trademark of Commodore Business Machines. Paperclip ® is a trademark of Batteries Included, Inc. & Wordpro 64 ® is a trademark of Professional Software, Inc.

BASIC magic

A Holiday Lesson For New Computer Owners

Michael S. Tomczyk

Computers are most fun at Christmas, so this month let's look at a potpourri of tips and tricks that owners of new computers will find helpful. Many of these are *not* explained very well in user manuals, which is why I'm including them here.

Erasing The Screen

One of the first things we do in most BASIC programs is clear (erase) the screen. To do this, type PRINT, a quotation mark, hold down SHIFT and press CLR/HOME (you should see a heart shape which represents the clear-screen character), then type another quotation mark, and press RETURN to enter the command:

```
PRINT"{CLR}"
```

This *erases* the screen. You can also add a message *inside* quotes, immediately after the clear command, and that message will appear at the top of your screen:

```
PRINT"{CLR}A CHRISTMAS
  PROGRAM"
```

Another way to clear the screen is to PRINT CHR$(147). (CHR$ is pronounced "character string.")

```
PRINT CHR$(147);"A NEW YEAR'S
  PROGRAM"
```

Notice that when using PRINT CHR$(147) you need to include a *semicolon*. This causes the message to appear on the first screen line. If you didn't use it, the message would appear on the second line. That's because every time you PRINT information on the screen, the computer automatically jumps down to the beginning of the next line. The semicolon prevents the computer from moving to the next line—in this sense the semicolon is like "programming glue."

Every character and editing function in your computer has its own CHR$ code—the codes are listed in the back of your user's manual. PRINTing one of these codes is the same as PRINTing the key or command itself.

There's a slight error in the CHR$ code chart found in the user's manual. CHR$(19) shows the CLR/HOME key in the chart but doesn't indicate whether the command is for CLEAR or HOME. CHR$(19) is the code for HOME. This command sends the cursor to the upper-left corner of the screen—called the "home" position—*without* erasing the screen. This is helpful for PRINTing long messages. Type in this program, then type RUN and press RETURN:

```
10 PRINT CHR$(147);
20 PRINT"MERRY CHRISTMAS..."
30 FOR T=1 TO 1000:NEXT
40 PRINT CHR$(19)"...AND HAPPY
   NEW YEAR!"
```

Let's examine this program line by line.

Line 10 clears the screen. We use a semicolon so the next message will appear on the top line. Line 20 PRINTs a message. Line 30 contains a very useful technique called a *time delay loop*. It uses a two-part command called FOR–NEXT to make the computer "count," and this delays the computer until it finishes counting. In this case, we told the computer to count to 1000. You can use a larger number to make the computer wait longer, or a smaller number for a shorter delay. Time delay loops are used to slow down programs.

Line 40 uses CHR$(19) to send the computer to the "home" position, then PRINTs the second message, "...HAPPY NEW YEAR!" This time we don't need a semicolon because the message is right after CHR$(19) in the same PRINT statement. In some cases you can omit the semicolon (if you're not sure, it doesn't hurt to leave it in).

Now type LIST and press RETURN. Your program automatically appears on the screen. You can use the cursor and INSerT/DELete keys to move around in the program and edit—insert and delete—commands. To make a change on any line, move the cursor to where you want to make the change, type the change, then press RETURN. The new program line will automatically replace the old one. Try this method to change "MERRY CHRISTMAS..." to "HAPPY HANUKKAH..." and then run the program to see the change.

Now, let's add a program line. LIST your program, type in this line, and press RETURN:

```
50 FOR T=1 TO 1000:NEXT:GOTO 10
```

REM: *If you haven't yet added line 50 to the program, try this. Type LIST and press RETURN. Line 30 looks almost exactly like this new line. Use the cursor up key to move the blinking cursor to the first character in line 30 and change the "3" to a "5". Now cursor right to the end of the line and add the colon, followed by GOTO 10, and press RETURN. If you LIST the program again, you'll find that line 30 is still there, and the new line 50 has been added. When you have several similar lines, you don't have to type each one. You can use the cursor controls to move around, change the line numbers, and save yourself a little typing.*

Now run the program. What did we do here? First, we put another *time delay loop* into the program. This causes the "HAPPY NEW YEAR" message to stay on the screen for a short time. Then we put a GOTO command at the end of the line. GOTO 10 tells the computer to "go to line 10." So the computer goes back to line 10 and keeps going back, over and over again until you stop it.

When a BASIC program keeps

going back and doing the same thing repeatedly, we say it's caught in an "endless loop." To break out of it, press the RUN/STOP key.

Using Variables

Variables are used in almost all programs. The letter T in our FOR-NEXT loop is a variable, for instance. We could have used any letter. I chose T to stand for "Time delay."

Variables like A, T, X, or AB, X3, P5, are called *numeric* variables because they stand for numbers. Variables like A$, T$, X$, or AB$, X3$, P5$ are called *string* variables ($ is pronounced "string"). They stand for letters, words, phrases, editing commands, and numbers not used in calculations (such as a social security number or address).

You can substitute a numeric variable for *any* number, and you can substitute a string variable for almost any group of letters, words, etc.

Type LIST and press RETURN. Now enter these lines:

```
15 M$="MERRY CHRISTMAS..."
20 PRINT M$
35 H$="...AND HAPPY NEW YEAR!"
40 PRINT CHR$(19) H$
```

Lines 15 and 35 will automatically be inserted in the appropriate place in our BASIC program. You can always add new lines just by typing them in. Lines 20 and 40 are replacement lines. They automatically replace the previous lines 20 and 40.

Type LIST to see the new program. It should look like this:

```
10 PRINT CHR$(147);
15 M$="MERRY CHRISTMAS..."
20 PRINT M$
30 FOR T=1 TO 1000:NEXT
35 H$="...AND HAPPY NEW YEAR!"
40 PRINT CHR$(19) H$
50 FOR T=1 TO 1000:NEXT:GOTO 10
```

This program works just like the previous one except we use string variables to display our messages. String variables are especially handy if you have to use a long message several times in your program. It's easier to define the message as a string variable and PRINT the variable instead of typing the message over and over.

Here's how our new program lines work:

Line 15 defines the variable M$ as "MERRY CHRISTMAS...". From now on, whenever M$ appears in this program, it's the same as "MERRY CHRISTMAS...". When you PRINT a variable, use the PRINT command and the variable *without* quotation marks. Line 35 is the same as line 15 except we use H$ to stand for "...AND HAPPY NEW YEAR!".

Line 40 PRINTs the HOME command followed by H$. Notice that you can put several different items after the same PRINT command. You can even PRINT several different variables next to each other, as in this example:

```
X$="HOLI":D$="DAY":PRINT X$;D$
```

Here's another quick tip concerning the semicolon. This information is usually hard for beginners to find. The VIC, Plus/4, and 16 allow only 88 characters on one program line and the 64 allows only 80. This limits the size of your messages. But what if you want to print a long paragraph or sentence? The way to do this is to link several messages together by using semicolons at the end of each PRINT statement. Here's an example.

To begin with, we'll work in upper/lowercase mode. There are two ways to put your computer in this mode. One way is to hold down the SHIFT and Commodore keys. (The Commodore key is in the lower-left corner.) The other way is to type PRINT CHR(14) and press RETURN. Either way, your computer works like a typewriter.

What you now type will be in lowercase, but commands will work just as they do when you type them in all capital letters. Type NEW and press RETURN to erase the previous program from the computer's memory, then try this example:

```
10 print chr$(147) chr$(14)
20 print"When in the course of human
   events, it becomes necessary for one
   peo";
30 print"ple to dissolve the political
   bands which have connected them
   with a";
40 print"nother, and to assume among
   the powers of the earth, the separate
   ";
50 print"and equal station to which the
   laws of nature and of nature's God
   en";
60 print"title them, a decent respect to
   the opinions of mankind requires
   tha";
70 print"t they should declare the causes
   which impel them to the separation."
80 print tab(6)"-Declaration of
   Independence"
```

Line 10 uses CHR$(147) to clear the screen. Then we print CHR$(14) to obtain upper/lowercase mode. If you want the display to start on the top line, add a semicolon at the end of the line. We also used the same PRINT command for two CHR$ codes by putting the codes next to each other as we did with the variables in our previous example.

Line 20 starts the message. (Capital letters are obtained by holding down SHIFT just as on a typewriter.) When we come to the end of the line, we cut the last word (people) and close the line with a quote and a semicolon. Lines 30–70 finish the message. Note that in some cases you have to leave a blank space at the beginning or end of a line.

When you're finished with this program, type NEW and press RETURN.

Numeric Variables

Let's look at a quick example that uses numeric variables.

```
10 A=5:B=10
20 PRINT A+B
```

In line 10 we define variables A and B, then in line 20 we add them and the computer displays the answer.

You can also use variables to count. For example, we know that the FOR-NEXT loop makes the computer count. That's how we create a time delay. We can also make the computer PRINT numbers being counted by the computer in the FOR-NEXT loop, like this:

```
10 FOR X=1 TO 100:PRINT X:NEXT X
```

Too fast, right? To slow it down, just insert a time delay loop. You can use more than one FOR-NEXT loop. In fact, you can use as many time delays as you need. Try this:

```
10 FOR X=1 TO 100:PRINT X:FOR T=1
   TO 200:NEXT T:NEXT X
```

This wraps up our Christmas package for this year. If you have a new computer under your tree, have fun and keep practicing your programming.

All Commodore 64 programs in this issue work with the Commodore 128 in 64 mode.

AARDVARK IS BACK ! !

With More Specials And Great New Games !

DUNGEONS OF MAGDARR - Serious D of D for up to 8 players. Features FULL 3-D GRAPHICS and characters that grow from day to day and game to game. A real dungeon with level after level of monsters to conquer and treasures to find. ALL in high res 3-D graphics
TRS-80C (32K EXT.), CMD64

SEARCH FOR MAGDARR - The adventure continues. The same characters from MAGDARR can play on - or you can assemble a whole new crew. SEARCH has a whole new plot, new monsters, new magic and new fight routines to speed and spice things up. Playable as sequel to Dungeons of Magdarr or as a stand alone game. Our best D of D.
IBMPC & JR. or CMD64

QUEST II - A new version of a great Adventure/D&D game. Played on a computer generated map of Alesia. You start with a small band of men and have to build a mighty army - then feed and arm them through combat, bargaining, exploitation of the natives - and outright banditry. Neat graphics, fast fight routines, and great reality simulation. Playable in 2-5 hours, but could take days to go through all the levels. Different each game.

NEW PRICE - $19.95 EACH - TAPE OR DISK

WELCOME BACK SPECIAL -
Both Search for Magdaar & Dungeons of Magdarr
- or -
Search for Magdarr & Quest II
$29.95 - TAPE OR DISK
$39.95 - FOR ALL THREE ! ! !

BAG-IT-MAN - One of the best arcade pieces ever done for the 64. Three screens full of action. You guide a little man who rides in elevators and mine carts and bashes guards with picks while he stashes bag after bag of gold. High quality from the background music to the dozens of graphic images. One of the few games to get that magic balance of being simple enough to play and complicated enough to keep you interested for days.

An Aardvark Come Back Giveaway Special!
$9.95 - Disk or Tape for C64 & TRS-80 Color

STARFIGHTER - This one will put you right in the turret of a Battlestar! It's fast and lively 3-D action. You can even rotate the turret to see what's behind you or to track the one that got away!

CMD64 DISK ONLY! $12.95

Then Christmas "Less Disks To Make" Special -
BAGITMAN AND STARFIGHTER (64 DISK ONLY)
$19.95 FOR BOTH

VISA MasterCard

AARDVARK
1690 Bolton - Walled Lake, MI 48088
(313) 669-3110

ADD $2.00 per order for shipping. Either specify your system and tape or disk - or settle for pot luck.

AUTHORS - Aardvark is looking for good original software for both C64 and IBM. Send $2 for our authors information package.

User Group Update

When writing to a user group for information, please remember to enclose a stamped, self-addressed envelope.

Send typed additions, corrections, and deletions for this list to:

COMPUTE! Publications
P.O. Box 5406
Greensboro, NC 27403
Attn: Commodore User Groups

User Group Notes

The Payson Area Commodore Users Group has a new contact person: Larry Muhlestein, P.O. Box 525, Salem, UT 84653.

The new contact person and address for the 20/64 Computer Users Group are Robert Simpson, P.O. Box 18788, San Jose, CA 95158-8788.

The Annapolis Commodore User's Group can now be reached at P.O. Box 3358, Annapolis, MD 21403.

The Narragansett Commodore Users Group has a new address and contact person: Kenneth Gaspar, P.O. Box 8707, Cranston, RI 02920.

The new address for the Bowling Green State University User Group is c/o Chris Hunt, 1451 Clough St., Bowling Green, OH 43402.

Plus/4 owners can now join a national user group called PLUG (Plus/4 Users' Group). Write Calvin Demmon, Box 1001, Monterey, CA 93940.

The correct address and contacts for the Dungeons and Dragons User's Group are: Glenn Halliburton and Ronnie Hastings, Rt. 1, Box 28A, Cumberland City, TN 37050.

New Listings

CALIFORNIA

Concord Area Commodore Enthusiasts (C.A.C.E.), Tim Schreiber, 4861 Boxer Blvd., Concord, CA 94521

Madera Users Group (MUG), P.O. Box 783, Madera, CA 93639

C-TUG Orange County, c/o Syntax Error, P.O. Box 8051, Orange, CA 92664

Monterey Peninsula Commodore Group, P.O. Box 2105, Seaside, CA 93955

64/20 Club, Greg Burns, 6464 Shearwater St., Ventura, CA 93003

CONNECTICUT

Interface 64, Brian Targonsky, Plains Rd., Haddam, CT 06438

ILLINOIS

Southern Illinois Commodore User Group, 508 W. Collins, Goreville, IL 62939

KENTUCKY

Logan County Commodore Users Club, Larry McDowell, P.O. Box 302, Lewisburg, KY 42256

MICHIGAN

64 Trident Software Club, Kevin Ballast, 7416 Westwood Dr., Jenison, MI 49428

Kalamazoo Valley Home Users Group, P.O. Box 3085, Kalamazoo, MI 49003

MINNESOTA

Central Minnesota Computer Users Group (CMCUG), David C. Hunt, 217 Riverside Ave. S, Sartell, MN 56377

MISSOURI

Heartland User's Group, Box 1251, Cape Girardeau, MO 63701

NEW JERSEY

NJ Commodore/Apple Computer Users Group, Emilio Garcia, 60 Devonshire Ct., Middletown, NJ 07748

Tri-County 64-User Group, 22 Jackson Village, Rutherford, NJ 07070

Commodore Crew User Group (C.C.U.G.) 304 Born St., Secaucus, NJ 07094

OHIO

Commodore Hammondsville Users Group of Ohio (C.H.U.G.O.), Randy Zimmer, P.O. Box 7, S.R. 213, Hammondsville, OH 43930

Cincinnati Commodore Computer Club, Wally Jones, Box 450, Owensville, OH 45160

PENNSYLVANIA

Lehigh Valley Medical Center, Thomas Duff, 3159 Middletown Rd., Bethlehem, PA 18017

Central Area Bulletin Board Systems (C.A.B.B.S.) User Group, Dave Warden, 4205 Ridgeview Rd., Harrisburg, PA 17112

TENNESSEE

Commodore Association South East (C.A.S.E.), P.O. Box 110386, Nashville, TN 37211

Nashville Commodore User Group, Joe Fetherling, P.O. Box 121282, Nashville, TN 37212

TEXAS

Business Interface Languages Limited (B.I.L.L.), P.O. Box 592, Adkins, TX 78101

VIRGINIA

Shenandoah Valley Commodore Users Group, Mary Habecker, 701 Butler Ave., Winchester, VA 22601

WASHINGTON

64 E/T, Don Winder, 127-182 Pl. SW, Bothell, WA 98012

WEST VIRGINIA

The 128 Society, 17 Silo Square, Lewisburg, WV 24901

WISCONSIN

Clintonville Area Commodore 64s True User Support (C.A.C.T.U.S.), Ethan Schoonover, 56 Pearl St., Clintonville, WI 54929

● On the September Gazette Disk, each custom character set for "Printer Wedge" included a message reminding users to merge the character set with the main program. If you don't have a merging utility, like "MetaBASIC," you can follow these directions to merge the character sets:

1. Load but don't run the main program for Printer Wedge. Delete line 10000 (type **10000** and press RETURN).

2. Enter **EB = PEEK(45) + PEEK (46) * 256 − 2: POKE43, EB AND 255: POKE 44, INT(EB/256): NEW**.

3. Load the character set you wish to add (for example, **LOAD "0:CSET3" ,8**) and add the line: **10000 DATA 0** (the DATA statement must always be a zero).

4. Type **POKE 43,1: POKE 44,8**.

5. Save the merged program, if you wish, and run it. Press f2 to install the new character set.

Also, some readers have had difficulties using Printer Wedge with *SpeedScript*. The two programs are compatible, but disk users must install the wedge at either 854 or 679. Tape users must select location 679 only. Don't press RUN/STOP–RESTORE; it disables the wedge. Follow these steps to use the two programs:

1. Load and run Printer Wedge.

2. Assign it to location 854 (679 for cassette).

3. Load and run *SpeedScript* without pressing RUN/STOP–RESTORE.

Finally, as noted in the article, if you want to use the custom characters to list a program to the printer, you should list to disk first. Here are step-by-step instructions:

1. Enable Printer Wedge and load the program to be listed.

2. **OPEN 1,8,2,"ASCIIFILE,S,W": CMD 1: LIST** to create a sequential ASCII file.

3. When the program has finished listing, **PRINT#1: CLOSE 1**.

4. Enter and run this program:

```
1 OPEN 1,8,2,"ASCIIFILE,S,R"
2 OPEN 4,4,7
3 GET#1,A$
4 IF (64 AND STATUS)=0 THEN
  PRINT#4,A$;: GOTO 3
5 CLOSE 1: PRINT#4: CLOSE 4
```

● The last part of line 240 in the 64 version of "Atom Shoot" (October) was accidentally cut off. The game runs as published, but it won't keep track of the correct number of guesses. Here's the correct line 240:

```
240 PRINTDN$"{73}"B"{LEFT} PTS
    {SPACE}{2 DOWN}{6 LEFT}
    {6 SPACES}":G=G+1    :rem 2
```

● "Turnabout" (October) runs as listed, but on level three the bonus timer counts down too quickly. To fix it, load and run MLX. The starting address is the same (49152), but the new ending address should be 51577. Use SHIFT-L to load Turnabout from tape or disk. Next, type SHIFT-N to enter a new line at 49329:

```
49329 :076,110,201,201,255,208,204
```

Next, enter SHIFT-N to correct two lines, beginning with 51566:

```
51566 :206,061,201,173,061,201,245
51572 :076,180,192,000,000,008,060
```

When the corrections have been made, type SHIFT-S to save to disk or tape.

● Readers who typed in "VIC Emulator" (September) to play the VIC-20 game "Enchanted Journey" (May) on their 64s may have been disappointed to find that the joystick routine does not read movement to the right. The following lines will correct the joystick routine:

```
82 POKE36869,205:SYS832:MA=0:M
   B=0:IFPEEK(830)=0AND(PEEK(3
   7152)=128)THEN241    :rem 46
84 IF(PEEK(37152)<>128)THENMA=
   1:IFCK=9THENMA=-1:GOTO87
                        :rem 11
```

Load VIC Emulator into your 64, run it, then load Enchanted Journey and make the changes above to Program 3.

● "Gradebook" (October) has no flaws that we're aware of. As noted in the article, when Gradebook is first loaded you should clear the workspace by typing SHIFT–CLR/ HOME. Also, you must enter the highest possible test score (a perfect mark) at the top of each column before starting to type individual grades. And, of course, you should turn on the printer before you give the command to print out the grades.

Some teachers have suggested adding an option to print out each student's grades. Parents could then be given a list of their child's marks, rather than seeing a complete list of all the students and their grades. The following program prints all the grades for an individual student:

```
100 IFATHEN130           :rem 36
110 INPUT"{CLR}{4 DOWN} GRADEB
    OOK FILENAME ";N$ :rem 185
120 A=1:LOADN$,8,1       :rem 207
130 OPEN4,4              :rem 90
140 S=16896:PRINT"{CLR}
    {4 DOWN}{2 SPACES}STUDENT
    {SPACE}NAME OR £ FOR ALL
    {SPACE}STUDENTS"   :rem 148
150 PRINTSPC(12)"[Q] TO QUIT":
    INPUT"{DOWN}{2 SPACES}";SN
    $:IFSN$="Q"THENCLOSE4:END
                         :rem 89
160 IF(PEEK(S)AND223)=0THENPRI
    NT"{DOWN}DONE":FORI=1TO100
    0:NEXT:GOTO140       :rem 11
170 FORA=25984TO26083:IFPEEK(A
    )=201THENB=A-25984:A=26083
                         :rem 226
180 NEXT:IFSN$="£"THEN240
                          :rem 8
190 IFPEEK(S)+64<>ASC(LEFT$(SN
    $+CHR$(0),1))THENS=S+128:G
    OTO160               :rem 122
200 IFLEN(SN$)=1THEN240:rem 73
210 FORA=2TOLEN(SN$)   :rem 194
220 IFASC(MID$(SN$,A,1)+CHR$(0
    ))<>PEEK(S+A-1)+64THENS=S+
    128:GOTO160          :rem 90
230 NEXT                :rem 212
240 FORA=0TO18:Q=PEEK(S+A):PRI
    NT#4,CHR$(Q+64+64*(Q=32));
    :NEXT:PRINT#4:PRINT#4
                         :rem 169
250 FORA=1TOB:PRINT#4,"ASSIGNM
    ENT#:"A;"PERFECT:"PEEK(259
    83+A);               :rem 33
260 PRINT#4,"WEIGHT:"PEEK(2623
    9+A);"MARK: ";       :rem 245
270 IFPEEK(S+19+A)=201THENPRIN
    T#4,"*":GOTO290      :rem 125
280 PRINT#4,PEEK(S+19+A)
                         :rem 116
290 NEXT:S=S+128:FORA=1TO5:PRI
    NT#4:NEXT:IFSN$="£"THENGO
    TO160                :rem 102
300 GOTO140              :rem 97
```

Tape users should change the 8 in line 120 to a 1. To adjust the printer's spacing, increase or decrease the 5 in line 290. After saving a Gradebook file to tape or disk, load and run the program above. Enter a student's name or type £ (the English-pound sign, left of the CLR/HOME key) to print the grades of the entire class.

How To Type In *COMPUTE!'s GAZETTE* Programs

Each month, COMPUTE!'s GAZETTE publishes programs for the Commodore 128, 64, Plus/4, 16, and VIC-20. Each program is clearly marked by title and version. Be sure to type in the correct version for your machine. All 64 programs run on the 128 in 64 mode. Be sure to read the instructions in the corresponding article. This can save time and eliminate any questions which might arise after you begin typing.

We frequently publish two programs designed to make typing easier: The Automatic Proofreader, and MLX, designed for entering machine language programs.

When entering a BASIC program, be especially careful with DATA statements as they are extremely sensitive to errors. A mistyped number in a DATA statement can cause your machine to "lock up" (you'll have no control over the computer). If this happens, the only recourse is to turn your computer off then back on, erasing whatever was in memory. So be sure to *save a copy of your program before you run it.* If your computer crashes, you can always reload the program and look for the error.

Special Characters

Most of the programs listed in each issue contain special control characters. To facilitate typing in any programs from the GAZETTE, use the following listing conventions.

The most common type of control characters in our listings appear as words within braces: {DOWN} means to press the cursor down key; {5 SPACES} means to press the space bar five times.

To indicate that a key should be *shifted* (hold down the SHIFT key while pressing another key), the character is underlined. For example, A means hold down the SHIFT key and press A. You may see strange characters on your screen, but that's to be expected. If you find a number followed by an underlined key enclosed in braces (for example, {8 A}), type the key as many times as indicated (in our example, enter eight SHIFTed A's).

If a key is enclosed in special brackets, [ ], hold down the Commodore key (at the lower left corner of the keyboard) and press the indicated character.

Rarely, you'll see a single letter of the alphabet enclosed in braces. This can be entered on the Commodore 64 by pressing the CTRL key while typing the letter in braces. For example, {A} means to press CTRL-A.

The Quote Mode

Although you can move the cursor around the screen with the CRSR keys, often a programmer will want to move the cursor under program control. This is seen in examples such as {LEFT} and {HOME} in the program listings. The only way the computer can tell the difference between direct and programmed cursor control is *the quote mode.*

Once you press the quote key, you're in quote mode. This mode can be confusing if you mistype a character and cursor left to change it. You'll see a reverse video character (a graphics symbol for cursor left). In this case, you can use the DELete key to back up and edit the line. Type another quote and you're out of quote mode. If things really get confusing, you can exit quote mode simply by pressing RETURN. Then just cursor up to the mistyped line and fix it.

When You Read:	Press:	See:
{CLR}	SHIFT + CLR/HOME	
{HOME}	CLR/HOME	
{UP}	SHIFT + ↑ CRSR ↓	
{DOWN}	↑ CRSR ↓	
{LEFT}	SHIFT + ← CRSR →	
{RIGHT}	← CRSR →	
{RVS}	CTRL + 9	
{OFF}	CTRL + 0	
{BLK}	CTRL + 1	
{WHT}	CTRL + 2	
{RED}	CTRL + 3	
{CYN}	CTRL + 4	

When You Read:	Press:	See:
{PUR}	CTRL + 5	
{GRN}	CTRL + 6	
{BLU}	CTRL + 7	
{YEL}	CTRL + 8	
{ F1 }	f1	
{ F2 }	SHIFT + f1	
{ F3 }	f3	
{ F4 }	SHIFT + f3	
{ F5 }	f5	
{ F6 }	SHIFT + f5	
{ F7 }	f7	
{ F8 }	SHIFT + f7	

When You Read:	Press:	See:
←	←	
↑	SHIFT + ↑	

For Commodore 64 Only

When You Read:	Press:	See:
[1]	COMMODORE + 1	
[2]	COMMODORE + 2	
[3]	COMMODORE + 3	
[4]	COMMODORE + 4	
[5]	COMMODORE + 5	
[6]	COMMODORE + 6	
[7]	COMMODORE + 7	
[8]	COMMODORE + 8	

The Automatic Proofreader

Charles Brannon, Program Editor

"The Automatic Proofreader" will help you type in program listings from COMPUTE!'s GAZETTE without typing mistakes. It is a short error-checking program that hides itself in memory. When activated, it lets you know immediately after typing a line from a program listing if you have made a mistake. Please read these instructions carefully before typing any programs in COMPUTE!'s GAZETTE.

Preparing The Proofreader

1. Using the listing below, type in the Proofreader. The same program works on both the VIC-20 and Commodore 64. Be very careful when entering the DATA statements—don't type an l instead of a 1, an O instead of a 0, extra commas, etc.

2. Save the Proofreader on tape or disk at least twice *before running it for the first time.* This is very important because the Proofreader erases this part of itself when you first type RUN.

3. After the Proofreader is saved, type RUN. It will check itself for typing errors in the DATA statements and warn you if there's a mistake. Correct any errors and save the corrected version. Keep a copy in a safe place—you'll need it again and again, every time you enter a program from COMPUTE's GAZETTE.

4. When a correct version of the Proofreader is run, it activates itself. You are now ready to enter a program listing. If you press RUN/STOP—RESTORE, the Proofreader is disabled. To reactivate it, just type the command SYS 886 and press RETURN.

Using The Proofreader

All VIC and 64 listings in COMPUTE!'s GAZETTE now have a *checksum number* appended to the end of each line, for example ":rem 123". *Don't enter this statement when typing in a program.* It is just for your information. The rem makes the number harmless if someone does type it in. It will, however, use up memory if you enter it, and it will confuse the Proofreader, even if you entered the rest of the line correctly.

When you type in a line from a program listing and press RETURN, the Proofreader displays a number at the top of your screen. *This checksum number must match the checksum number in the printed listing.* If it doesn't, it means you typed the line differently than the way it is listed. Immediately recheck your typing. Remember, don't type the rem statement with the checksum number; it is published only so you can check it against the number which appears on your screen.

The Proofreader is not picky with spaces. It will not notice extra spaces or missing ones. This is for your convenience, since spacing is generally not important. But occasionally proper spacing *is* important, so be extra careful with spaces, since the Proofreader will catch practically everything else that can go wrong.

There's another thing to watch out for: if you enter the line by using abbreviations for commands, the checksum will not match up. But there is a way to make the Proofreader check it. After entering the line, LIST it. This eliminates the abbreviations. Then move the cursor up to the line and press RETURN. It should now match the checksum. You can check whole groups of lines this way.

Special Tape SAVE Instructions

When you're done typing a listing, you must disable the Proofreader before saving the program on tape. Disable the Proofreader by pressing RUN/STOP–RESTORE (hold down the RUN/STOP key and sharply hit the RESTORE key). This procedure is not necessary for disk SAVEs, *but you must disable the Proofreader this way before a tape SAVE.*

SAVE to tape erases the Proofreader from memory, so you'll have to load and run it again if you want to type another listing. SAVE to disk does not erase the Proofreader.

Since the Proofreader is a machine language program stored in the cassette buffer, it will be erased during a tape SAVE or LOAD. If you intend to type in a program in more than one sitting or wish to make a safety SAVE, follow this procedure:

1. Load and run the Proofreader.
2. Disable it by pressing RUN/STOP–RESTORE.
3. Type the following two lines in direct mode (without line numbers):

```
A$="PROOFREADER.T":FORX=1TO40:A$=A$+" ":NEXT
FORX=886TO1018:A$=A$+CHR$(PEEK(X)):NEXT:OPEN1,1,1,A$:CLOSE1
```

After you type the last line, you will be asked to press RECORD and PLAY. We recommend you start at the beginning of a new tape.

You now have a new version of the Proofreader (PROOFREADER.T, as renamed in the above code). Turn your computer off and on, then load the program you were working on. Put the cassette containing PROOFREADER.T into the tape unit and type:

```
OPEN1:CLOSE1
```

You can now get into the Proofreader by typing SYS 886. To test this, PRINT PEEK (886) should return the number 173. If it does not, repeat the steps above, making sure that A$ (PROOFREADER.T) contains 13 characters.

The new version of Automatic Proofreader will load itself into the cassette buffer whenever you type OPEN1: CLOSE1 and PROOFREADER.T is the next program on your tape. It will not disturb the contents of BASIC memory.

The above code converts the machine language program into characters that are concatenated into a string. When you open a tape file, using the string as the name of the file, the tape header contains the machine language program (disguised as part of the filename). Opening and closing the tape file loads the header into the cassette buffer, but does not disturb BASIC programs already in memory.

Automatic Proofreader For VIC And 64

```
10 PRINT"{CLR}PLEASE WAIT...":FOR
   I=886TO1018:READA:CK=CK+A:POKE
   I,A:NEXT
20 IF CK<>17539 THEN PRINT"{DOWN}
   YOU MADE AN ERROR":PRINT"IN DA
   TA STATEMENTS.":END
30 SYS886:PRINT"{CLR}{2 DOWN}PROO
   FREADER ACTIVATED.":NEW
40 DATA 173,036,003,201,150,208
50 DATA 001,096,141,151,003,173
60 DATA 037,003,141,152,003,169
70 DATA 150,141,036,003,169,003
80 DATA 141,037,003,169,000,133
90 DATA 254,096,032,087,241,133
100 DATA 251,134,252,132,253,008
110 DATA 201,013,240,017,201,032
120 DATA 240,005,024,101,254,133
130 DATA 254,165,251,166,252,164
140 DATA 253,040,096,169,013,032
150 DATA 210,255,165,214,141,251
160 DATA 003,206,251,003,169,000
170 DATA 133,216,169,019,032,210
180 DATA 255,169,018,032,210,255
190 DATA 169,058,032,210,255,166
200 DATA 254,169,000,133,254,172
210 DATA 151,003,192,087,208,006
220 DATA 032,205,189,076,235,003
230 DATA 032,205,221,169,032,032
240 DATA 210,255,032,210,255,173
250 DATA 251,003,133,214,076,173
260 DATA 003
```

MLX Machine Language Entry Program For Commodore 64

Charles Brannon, Program Editor

MLX is a labor-saving utility that allows almost fail-safe entry of machine language programs published in COMPUTE!'s GAZETTE. You need to know nothing about machine language to use MLX—it was designed for everyone.

MLX is a new way to enter long machine language (ML) programs with a minimum of fuss. MLX lets you enter the numbers from a special list that looks similar to BASIC DATA statements. It checks your typing on a line-by-line basis. It won't let you enter illegal characters when you should be typing numbers. It won't let you enter numbers greater than 255 (forbidden in ML). It won't let you enter the wrong numbers on the wrong line. In addition, MLX creates a ready-to-use tape or disk file. You can then use the LOAD command to read the program into the computer, as with any program:

```
LOAD "filename" (for tape)
LOAD "filename",8,1 (for disk)
```

To start the program, you enter a SYS command that transfers control from BASIC to machine language.The starting SYS number always appears in the appropriate article.

Using MLX

Type in and save MLX (you'll want to use it in the future). When you're ready to type in an ML program, run MLX. MLX asks you for two numbers: the starting address and the ending address. These numbers are given in the article accompanying the ML program.

You'll see a prompt corresponding to the starting address. The prompt is the current line you are entering from the listing. It increases by six each time you enter a line. That's because each line has seven numbers—six actual data numbers plus a *checksum number*. The checksum verifies that you typed the previous six numbers correctly. If you enter any of the six numbers wrong, or enter the checksum wrong, the computer rings a buzzer and prompts you to reenter the line. If you enter it correctly, a bell tone sounds and you continue to the next line.

MLX accepts only numbers as input. If you make a typing error, press the INST/DEL key; the entire number is deleted. You can press it as many times as necessary back to the start of the line. If you enter three-digit numbers as listed, the computer automatically prints the comma and goes on to accept the next number. If you enter less than three digits, you can press either the SPACE bar or RETURN key to advance to the next number. The checksum automatically appears in inverse video for emphasis.

To simplify your typing, MLX redefines part of the keyboard as a numeric keypad:

```
  U I O              7 8 9
H J K L  become     0 4 5 6
  M , .              1 2 3
```

MLX Commands

When you finish typing an ML listing (assuming you type it all in one session) you can then save the completed program on tape or disk. Follow the screen instructions. If you get any errors while saving, you probably have a bad disk, or the disk is full, or you've made a typo when entering the MLX program itself.

You don't have to enter the whole ML program in one sitting. MLX lets you enter as much as you want, save it, and then reload the file from tape or disk later.

MLX recognizes these commands:

SHIFT-S: Save SHIFT-N: New Address
SHIFT-L: Load SHIFT-D: Display

When you enter a command, MLX jumps out of the line you've been typing, so we recommend you do it at a new prompt. Use the Save command to save what you've been working on. It will save on tape or disk, as if you've finished, but the tape or disk won't work, of course, until you finish the typing. Remember what address you stop at. The next time you run MLX, answer all the prompts as you did before, then insert the disk or tape. When you get to the entry prompt, press SHIFT-L to reload the partly completed file into memory. Then use the New Address command to resume typing.

To use the New Address command, press SHIFT-N and enter the address where you previously stopped. The prompt will change, and you can then continue typing. Always enter a New Address that matches up with one of the line numbers in the special listing, or else the checksum won't work. The Display command lets you display a section of your typing. After you press SHIFT-D, enter two addresses within the line number range of the listing. You can abort the listing by pressing any key.

What if you forgot where you stopped typing? Use the Display command to scan memory from the beginning to the end of the program. When you reach the end of your typing, the lines will contain a random pattern of numbers. When you see the end of your typing, press any key to stop the listing. Use the New Address command to continue typing from the proper location.

See program listings on page 160.

All Commodore 64 programs in this issue work with the Commodore 128 in 64 mode.

All Commodore 64 programs in this issue work with the Commodore 128 in 64 mode.

Auto Time And Date

Article on page 94.

BEFORE TYPING . . .

Before typing in programs, please refer to "How To Type In COMPUTE!'s GAZETTE Programs," which appears before the Program Listings.

```
100 CK=56328:SA=49155:REM SA I
    S ML STARTING ADDRESS
                        :rem 208
110 FORI=SATOSA+151:READA:X=X+
    A:POKEI,A:NEXTI     :rem 151
120 IFX<>16817THENPRINT"ERROR
    {SPACE}IN DATA STATEMENTS.
    ":STOP              :rem 236
130 PRINT"{CLR}":A=SA+137:POKE
    SA+13,A-INT(A/256)*256:POK
    ESA+14,INT(A/256)   :rem 66
140 POKESA+145,A-INT(A/256)*25
    6:POKESA+146,INT(A/256)
                        :rem 255
150 POKESA+36,SA-INT(SA/256)*2
    56:POKESA+37,INT(SA/256)
                        :rem 151
160 PRINT"TODAY'S DATE (MM/DD/
    YY, IE. 07/01/85)":INPUT D
    A$                  :rem 242
170 IFLEN(DA$)<>8THENPRINT"
    {DOWN}ERROR IN DATE ENTRY.
     TRY AGAIN!{DOWN}":GOTO160
                        :rem 93
180 PRINT"{DOWN}PRESENT TIME (
    HHMM FORMAT, IE. 0935)":IN
    PUTTM$              :rem 87
190 IFLEN(TM$)=4ANDVAL(TM$)<=1
    259THEN210          :rem 103
200 PRINT"{DOWN}ERROR IN TIME
    {SPACE}ENTRY. TRY AGAIN!
    {DOWN}":GOTO180     :rem 33
210 PRINT:INPUT"AM OR PM (
    {RVS}A{OFF}/{RVS}P{OFF})";
    A$:IF A$<>"A" AND A$<>"P"
    {SPACE}THEN 210     :rem 40
220 TM$=TM$+"00":B=0:IF A$="P"
     THEN B=128         :rem 91
230 PRINT"{CLR}TODAY'S DATE: "
    ;DA$:PRINT          :rem 247
240 PRINT"PRESENT TIME: ";LEFT
    $(TM$,2);":";MID$(TM$,3,2)
    ;" ";A$;"M"         :rem 159
250 PRINT:PRINT:INPUT"ARE THES
    E CORRECT (Y/N){2 SPACES}Y
    {3 LEFT}";A$        :rem 83
260 IFA$="N"THENPRINT"{CLR}":G
    OTO160              :rem 248
270 FORT=1TO8:POKESA+T,ASC(MID
    $(DA$,T,1)):NEXTT:IFLEFT$(
    TM$,2)="12"THENB=128-B
                        :rem 183
280 FORA=1TO5STEP2:D=VAL(MID$(
    TM$,A,1)):D=D*16+VAL(MID$(
    TM$,A+1,1))         :rem 108
290 IFA=1THEND=DORB     :rem 176
300 POKECK+3-(A-1)/2,D:NEXTA:P
    OKECK,0             :rem 169
310 POKESA+142,PEEK(818):POKES
    A+143,PEEK(819)     :rem 96
320 REM GET ISAVE VECTOR ADDR
    {SPACE}AND SAVE TO EXIT IN
     ML                 :rem 206
330 A=SA+15:POKE818,A-INT(A/25
    6)*256:POKE819,INT(A/256)
                        :rem 109
340 REM POINT ISAVE VECTOR TO
    {SPACE}START OF ML:rem 175
350 POKESA+150,PEEK(774):POKES
    A+151,PEEK(775)     :rem 100
360 REM GET IQPLOP (LIST) VECT
    OR ADDR AND SAVE TO EXIT I
    N ML                :rem 188
370 A=SA+11:POKE774,A-INT(A/25
    6)*256:POKE775,INT(A/256)
                        :rem 111
380 REM POINT IQPLOP (LIST) VE
    CTOR TO START OF ML
                        :rem 157
390 NEW                 :rem 134
400 DATA 32,48,48,47,48,48,47,
    48,48,32,0          :rem 190
410 DATA 8,238,197,3,72,138,72
    ,152,72,162,0       :rem 72
420 DATA 160,4,177,43,201,143,
    208,102,200         :rem 203
430 DATA 177,43,240,97,189,60,
    3,240,5,145         :rem 233
440 DATA 43,232,208,241,162,2,
    177,43,240          :rem 168
450 DATA 78,189,9,220,41,127,7
    4,74,74,74          :rem 200
460 DATA 9,48,145,43,200,177,4
    3,240,60            :rem 78
470 DATA 189,9,220,41,15,9,48,
    145,43,202          :rem 181
480 DATA 240,12,200,177,43,240
    ,43,169,58          :rem 177
490 DATA 145,43,200,208,210,20
    0,169,32            :rem 66
500 DATA 145,43,200,173,11,220
    ,48,5,169           :rem 116
510 DATA 65,208,3,234,169,80,1
    45,43,200           :rem 124
520 DATA 169,77,145,43,200,177
    ,43,240,6           :rem 132
530 DATA 169,32,145,43,208,245
    ,173,8,220          :rem 180
540 DATA 104,168,104,170,169,0
    ,208,4,104          :rem 167
550 DATA 76,0,0,206,197,3,104,
    40,76,0,0           :rem 107
```

All Commodore 64 programs in this issue work with the Commodore 128 in 64 mode.

Disk File Archiver

See instructions in article on page 93 before typing in.

```
49152 :011,008,158,050,048,054,073
49158 :049,169,010,141,130,002,251
49164 :032,024,008,076,148,227,015
49170 :162,076,160,008,142,050,104
49176 :003,140,051,003,096,032,093
49182 :207,255,032,207,255,169,131
49188 :013,032,210,255,032,207,017
49194 :255,072,032,210,255,104,202
49200 :201,013,208,244,032,104,082
49206 :009,162,128,108,003,169,121
49212 :160,160,009,032,030,171,110
49218 :076,058,008,165,187,133,181
49224 :002,165,188,133,003,165,216
49230 :183,133,004,032,237,245,144
49236 :169,032,189,255,032,087,080
49242 :009,032,207,255,201,050,076
49248 :176,003,076,058,008,201,106
49254 :054,208,178,032,207,255,012
49260 :201,051,208,174,032,207,213
49266 :255,201,013,208,249,032,048
49272 :104,009,169,032,160,039,121
49278 :153,060,003,136,016,250,232
49284 :164,004,192,011,176,176,087
49290 :136,177,002,153,063,003,160
49296 :153,078,003,136,016,245,007
49302 :169,046,141,073,003,141,211
49308 :088,003,169,052,141,074,171
49314 :003,160,002,185,136,009,145
49320 :153,060,003,136,016,247,015
49326 :169,015,162,060,160,003,231
49332 :032,189,255,032,087,009,016
49338 :032,104,009,160,002,185,166
49344 :133,009,153,060,003,153,191
49350 :075,003,136,016,244,169,073
49356 :061,141,075,003,169,052,193
49362 :141,074,003,133,254,169,216
49368 :051,141,089,003,169,030,187
49374 :162,060,160,003,032,189,060
49380 :255,032,087,009,032,207,082
49386 :255,201,050,144,002,198,060
49392 :254,032,104,009,032,113,016
49398 :009,206,074,003,206,089,065
49404 :003,173,089,003,201,048,001
49410 :208,216,169,032,141,088,088
49416 :003,141,089,003,165,004,157
49422 :024,105,018,162,060,160,031
49428 :003,032,189,255,032,087,106
49434 :009,032,104,009,169,133,226
49440 :157,169,139,160,009,032,186
49446 :030,171,165,254,032,210,132
49452 :255,169,002,168,162,008,040
49458 :032,186,255,165,004,162,086
49464 :063,160,003,032,189,255,246
49470 :169,043,166,045,164,046,183
49476 :032,216,255,169,128,133,233
49482 :157,076,091,008,169,015,078
49488 :162,008,168,032,186,255,123
49494 :032,192,255,162,015,032,006
49500 :198,255,096,169,015,032,089
49506 :195,255,032,204,255,096,111
49512 :169,032,189,255,032,087,100
49518 :009,032,207,255,201,013,059
49524 :208,249,032,104,009,096,046
49530 :082,048,058,083,048,058,243
49536 :013,145,082,069,078,065,068
49542 :077,069,029,029,029,029,140
49548 :029,029,029,029,029;029,058
49554 :029,046,013,070,073,076,197
49560 :069,078,065,077,069,032,030
49566 :084,079,079,032,076,079,075
49572 :078,071,013,013,013,013,109
```

All Commodore 64 programs in this issue work with the Commodore 128 in 64 mode.

Soundpix

Article on page 86.

```
10 DIMW(84),X(84):POKE53280,12
   :POKE53281,0:PRINTCHR$(147)
   CHR$(5)              :rem 142
20 X1=170:X2=250:Y1=105:Y2=Y1+
   21:Y3=Y2+21:Y4=Y3+21:Q=1228
   8:Q1=12801:V=53248:C=2
                        :rem 196
30 E=54299:F=54300:D=32:A=.5:O
   =1:I=2:S=3:T=0:E$="
   {12 SPACES}"         :rem 235
40 FORT=54272TO54295:POKET,0:N
   EXT:POKE54296,143:FORT=QTO1
   2798:POKET,0:NEXT    :rem 152
```

```
50 FORT=2040TO2047:POKET,T-184
   8:NEXT                :rem 203
60 POKEV,X1:POKEV+1,Y1:POKEV+2
   ,X1:POKEV+3,Y2:POKEV+4,X1:P
   OKEV+5,Y3:POKEV+6,X1
                         :rem 149
70 POKEV+7,Y4:POKEV+8,X2:POKEV
   +9,Y1:POKEV+10,X2:POKEV+11,
   Y2:POKEV+12,X2        :rem 191
80 POKEV+13,Y3:POKEV+14,X2:POK
   EV+15,Y4              :rem 66
90 FORT=39TO42:POKEV+T,3:NEXT:
   FORT=43TO46:POKEV+T,7:NEXT
                         :rem 172
100 POKEV+23,0:POKEV+29,255
                         :rem 31
110 POKE54273,10:POKE54287,6
                         :rem 40
120 A$="":POKE214,C+1:PRINT:PO
   KE211,2:INPUT"WAVEFORM";A$
   :GOSUB560:IFU=0THEN120
                         :rem 29
130 W=VAL(A$):IFW=0ORW>255THEN
   120                   :rem 226
140 IFW=65THENGOSUB530:rem 106
150 A$="":POKE214,C+2:PRINT:PO
   KE211,2:INPUT"ATT/DEC";A$:
   GOSUB560:IFU=0THEN150
                         :rem 161
160 AD=VAL(A$):IFAD=0ORAD>255T
   HEN150                :rem 114
170 A$="":POKE214,C+3:PRINT:PO
   KE211,2:INPUT"SUS/REL";A$:
   GOSUB560:IFU=0THEN170
                         :rem 207
180 SR=VAL(A$):IFSR=0ORSR>255T
   HEN170                :rem 214
190 A$="":POKE214,C+4:PRINT:PO
   KE211,2:INPUT"SUS TIME";A$
   :GOSUB560:IFU=0THEN190
                         :rem 241
200 S1=VAL(A$):IFS1=0ORS1>84TH
   EN190                 :rem 62
210 A$="":POKE214,C+5:PRINT:PO
   KE211,2:INPUT"REL TIME";A$
   :GOSUB560:IFU=0THEN210
                         :rem 204
220 S2=VAL(A$):IFS2=0ORS2>84TH
   EN210                 :rem 60
230 S3=S1+S2:IFS3>84THEN190
                         :rem 78
240 POKE54277,AD:POKE54278,SR:
   POKE54291,AD:POKE54292,SR
                         :rem 34
250 POKE54275,PW:POKE54289,PW:
   POKE54276,W:POKE54290,W:PO
   KEV+21,255            :rem 225
260 FORT=0TOS1:W(T)=PEEK(E):X(
   T)=PEEK(F):NEXT:POKE54276,
   0:POKE54290,0         :rem 212
270 FORT=S1TOS3:W(T)=PEEK(E):X
   (T)=PEEK(F):NEXT      :rem 149
280 FORT=S3TO84:W(T)=0:X(T)=0:
   NEXT                  :rem 103
290 POKE214,3:PRINT:POKE211,19
   :PRINT"WAVE{6 SPACES}ADSR
                         :rem 96
300 POKE214,4:PRINT:POKE211,19
   :PRINT"1 2 3{5 SPACES}1 2
   {SPACE}3              :rem 40
310 POKE214,5:PRINT:POKE211,19
   :PRINT"§5 T§{5 SPACES}
   §5 T§                 :rem 92
320 FORT=0TO20:GOSUB510:NEXT:Q
   =Q+1                  :rem 128
330 FORT=21TO41:GOSUB510:NEXT:
   Q=Q+1                 :rem 183
340 FORT=42TO62:GOSUB510:NEXT:
   Q=Q+1                 :rem 190
350 FORT=63TO83:GOSUB510:NEXT:
   Q=Q+1                 :rem 197
360 FORT=0TO20:GOSUB520:NEXT:Q
   =Q+1                  :rem 133
370 FORT=21TO41:GOSUB520:NEXT:
   Q=Q+1                 :rem 188
380 FORT=42TO62:GOSUB520:NEXT:
   Q=Q+1                 :rem 195
390 FORT=63TO83:GOSUB520:NEXT
                         :rem 85
400 IFQ<>Q1THENPOKE214,18:PRIN
   T:POKE211,22:PRINT"ERASE (
   E)"                   :rem 95
410 IFQ<>Q1THENPOKE214,19:PRIN
   T:POKE211,22:PRINT"QUIT (Q
   )"                    :rem 64
420 IFQ<>Q1THENPOKE214,20:PRIN
   T:POKE211,22:PRINT"COMPARE
    (C)"                 :rem 239
430 IFQ=Q1THENPOKE214,18:PRINT
   :POKE211,22:PRINT"ERASE (E
   )"                    :rem 37
440 IFQ=Q1THENPOKE214,19:PRINT
   :POKE211,22:PRINT"QUIT (Q)
   "                     :rem 6
450 GETA$:IFA$<>"E"THENIFA$<>"
   C"THENIFA$<>"Q"THEN450
                         :rem 45
460 IFA$="E"THENRUN      :rem 120
470 IFA$="C"THENIFQ=Q1THENRUN
                         :rem 69
480 IFA$="C"THENQ=Q-510:C=C+6:
   POKE214,18:PRINT      :rem 223
490 IFA$="C"THENFORT=1TO3:POKE
   211,22:PRINTE$:NEXT:GOTO12
   0                     :rem 63
500 PRINTCHR$(147)CHR$(154):PO
   KEV+21,0:POKE54296,0:POKE5
   3280,14:POKE53281,6:END
                         :rem 79
510 POKEQ,(I↑INT(W(T)/D+A))-OO
   RO:Q=Q+3:RETURN       :rem 78
520 POKEQ,(I↑INT(X(T)/D+A))-OO
   RO:Q=Q+3:RETURN       :rem 80
530 POKE214,C+1:PRINT:POKE211,
   2:INPUT"PULSE WIDTH";A$:GO
   SUB560:IFU=0THEN530
                         :rem 169
540 PW=VAL(A$):IFPW=0ORPW>255T
   HEN530                :rem 220
550 RETURN               :rem 122
560 IFA$=""THENRETURN    :rem 31
570 FORN=1TOLEN(A$):U=ASC(MID$
   (A$,N,1)):IFU<47ORU>57THEN
   U=0:RETURN            :rem 102
580 NEXT:RETURN          :rem 246
```

All Commodore 64 programs in this issue work with the Commodore 128 in 64 mode.

Power BASIC: List Pager

See special instructions in article on page 72 before typing in.

```
100 PRINT"{CLR}{3 DOWN} *** LI
    ST PAGER ***":FORI=1TO185:
    READA:F$=F$+CHR$(A):NEXT
                         :rem 1
110 PRINT"{2 DOWN}SAVE ON
    {RVS}T{OFF}APE OR {RVS}D
    {OFF}ISK?"           :rem 206
120 GETA$:IFA$<>"T"ANDA$<>"D"T
    HEN120               :rem 20
130 PRINT"{CLR}":IFA$="D"THEN1
    50                   :rem 176
140 OPEN1,1,1,F$:CLOSE1:END
                         :rem 58
150 INPUT"FILENAME";N$:OPEN1,8
    ,4,N$+",P,W":PRINT#1,CHR$(
    65)CHR$(3)F$:CLOSE1
                         :rem 153
160 DATA 169,1,133,251,173,39,
    3,201,3,240,9,141    :rem 250
170 DATA 251,3,173,38,3,141,25
    0,3,169,127,141,38   :rem 53
180 DATA 3,169,3,141,39,3,32,1
    15,0,32,115,0,160    :rem 237
190 DATA 0,132,252,177,122,240
    ,9,201,34,240,6      :rem 148
200 DATA 145,55,200,208,243,24
    ,132,253,152,101     :rem 193
210 DATA 122,133,122,96,132,25
    4,72,165,154,201     :rem 204
220 DATA 4,208,50,165,252,208,
    6,32,192,3,32,242    :rem 251
230 DATA 3,104,72,201,13,208,3
    4,32,242,3,164,252   :rem 32
240 DATA 192,58,208,21,32,242,
    3,200,192,66,208     :rem 210
250 DATA 248,169,0,133,252,165
    ,251,248,24,105,1    :rem 6
260 DATA 216,133,251,104,164,2
    54,96,104,164,254    :rem 11
270 DATA 76,249,3,165,253,240,
    23,160,0,196,253     :rem 220
280 DATA 240,17,177,55,201,35,
    208,5,32,222,3,169   :rem 55
290 DATA 0,32,249,3,200,208,23
    5,76,242,3,165,251   :rem 50
300 DATA 74,74,74,74,9,48,32,2
    49,3,165,251,41,15   :rem 68
310 DATA 9,48,76,249,3,230,252
    ,169,13,76,249,3,76
                         :rem 128
```

All Commodore 64 programs in this issue work with the Commodore 128 in 64 mode.

Variable Saver—Home Budget Program

Article on page 76.

BEFORE TYPING . . .

Before typing in programs, please refer to "How To Type In COMPUTE!'s GAZETTE Programs," which appears before the Program Listings.

```
100 REM"↑↑↑↑↑↑↑↑ DUMMY LINE FO
    R SAVED POINTERS.    :rem 63
110 REM ************************
    ************         :rem 52
120 REM **{2 SPACES}HOME
    {2 SPACES}BUDGET{2 SPACES}
    PLANNING{2 SPACES}AID
    {2 SPACES}**         :rem 40
```

```
130 REM ************************
    *************       :rem 54
140 REM ***** IF ↑ STILL THERE
    , NO VARIABLE POOL POINTER
    S SAVED *****         :rem 219
150 IFPEEK(PEEK(43)+PEEK(44)*2
    56+7)=255GOTO230      :rem 81
160 REM ***** RESTORE VARIABLE
     POOL POINTERS *****
                          :rem 55
170 POKE45,PEEK(PEEK(43)+PEEK(
    44)*256+6)            :rem 224
180 POKE46,PEEK(PEEK(43)+PEEK(
    44)*256+7)            :rem 227
190 PS=PEEK(43)+PEEK(44)*256:F
    ORX=0TO5              :rem 229
200 POKE 47+X,PEEK(PS+8+X):NEX
    T                     :rem 83
210 POKE55,PEEK(45):POKE56,PEE
    K(46)+4:GOTO250: REM FASTE
    R SAVE/LOAD           :rem 225
220 REM ***** PERFORM FIRST TI
    ME INITIALIZATION *****
                          :rem 22
230 GOTO580               :rem 107
240 REM ***** CALCULATE AND DI
    SPLAY *****           :rem 149
250 PRINTCS$;:USED=0:FORI=0TOD
    S                      :rem 2
260 PC=(AMT(I)/AMT(0)+.005)*10
    0                     :rem 112
270 I$=RIGHT$(STR$(I)+" ",3)
                          :rem 187
280 A$=RIGHT$("{3 SPACES}"+STR
    $(AMT(I)),5)          :rem 233
290 PC$=RIGHT$(" "+STR$(INT(PC
    )),3)                 :rem 141
300 PRINTI$;LEFT$(ITEM$(I)+FS$
    ,FS);A$;              :rem 221
310 IFI>0THENPRINTPC$"%";:USED
    =USED+AMT(I)          :rem 113
320 PRINT:NEXT            :rem 155
330 PRINT"BUDGETED ="USED;BS$;
    INT((USED/AMT(0))*100);BS$
    "%"                   :rem 176
340 LEFT=AMT(0)-USED:PRINT"REM
    AINING="LEFT;BS$;INT((LEFT
    /AMT(0))*100);BS$"%"
                          :rem 94
350 REM ***** PROMPT FOR USER
    {SPACE}CHANGES *****
                          :rem 33
360 PRINTRV$" CHG "RO$"I"RV$"T
    EM, "RO$"A"RV$"MT, "RO$"N"
    RV$"ONE?"RO$          :rem 240
370 GETB$                 :rem 224
380 IFB$="N" GOTO470      :rem 51
390 IFB$="A" GOTO420      :rem 34
400 IFB$="I" GOTO440      :rem 36
410 GOTO370               :rem 104
420 PRINT"ITEM #"RV$","RO$"ACT
    UAL AMT":INPUTZ,A:IFZ>DSTH
    EN420                 :rem 232
430 AMT(Z)=A:GOTO250      :rem 172
440 PRINT"ITEM #"RV$","RO$"ITE
    M DESC.":INPUTZ,Z$:IFZ>DST
    HEN440                 :rem 9
450 ITEM$(Z)=LEFT$(Z$+FS$,FS):
    GOTO250               :rem 169
460 REM ***** PROMPT FOR SAVE
    {SPACE}VARIABLES *****
                          :rem 179
470 PRINTCU$RV$" SAVE DATA+PGM
    Y/N?{2 SPACES}"       :rem 97
480 GETX$:IFX$="N"THENPRINTCU$
    RV$"SYS"STR$(SR)"
    {2 SPACES}OR GOTO100 TO RU
    N.";:END              :rem 103
490 IFX$<>"Y"THEN480      :rem 138
500 REM ***** SAVE VARIABLE PO
    OL POINTERS *****     :rem 64
510 PRINTCS$"READY FOR SAVE OF
     PROGRAM AND VARIABLES TO
    {SPACE}TAPE OR DISK."
                          :rem 140
520 PRINT"AFTER SAVE, ENTER 'S
    YS"SR"', OR 'GOTO 100'."
                          :rem 252
530 PS=PEEK(43)+PEEK(44)*256:F
    ORX=0TO7              :rem 229
540 POKE PS+6+X,PEEK(45+X):NEX
    T                     :rem 86
550 POKE45,PEEK(55):POKE46,PEE
    K(56)                 :rem 30
560 END                   :rem 114
570 REM ***** FIRST TIME VARIA
    BLE INITIALIZATION *****
                          :rem 73
580 POKE55,PEEK(45):POKE56,PEE
    K(46)+4:CLR: REM FASTER SA
    VE/LOAD               :rem 252
590 REM 256*4=1024 VARIABLE PO
    OL SIZE               :rem 60
600 REM *VIC* SR=64802:DS=17:C
    S$=CHR$(147):FS=9:FS$="...
    ......."             :rem 138
610 SR=64738:DS=19:CS$=CHR$(14
    7):FS=27:FS$="........
    ..............."     :rem 231
620 PRINTCS$" ?NET MONTHLY INC
    OME?"                 :rem 110
630 DIMAMT(DS),ITEM$(DS)
                          :rem 164
640 INPUT AMT(0)          :rem 141
650 ITEM$(0)="*INCOME* ":AMT(0
    )=INT(AMT(0))         :rem 120
660 ITEM$(1)="HOUSING
    {2 SPACES}":AMT(1)=850
                          :rem 135
670 ITEM$(2)="GROCERIES":AMT(2
    )=100                  :rem 4
680 ITEM$(3)="GAS/ELEC.":AMT(3
    )=53                  :rem 140
690 ITEM$(4)="TELEPHONE":AMT(4
    )=14                  :rem 223
700 ITEM$(5)="LOAN #1
    {2 SPACES}":AMT(5)=155
                          :rem 233
710 ITEM$(6)="LOAN #2
    {2 SPACES}":AMT(6)=145
                          :rem 236
720 ITEM$(7)="GASOLINE ":AMT(7
    )=20                  :rem 138
730 ITEM$(8)="INSURANCE":AMT(8
    )=43                  :rem 232
740 ITEM$(9)="CAR MAINT":AMT(9
    )=12                  :rem 142
750 ITEM$(10)="MC / VISA":AMT(
    10)=70                :rem 134
760 ITEM$(11)="DONATIONS":AMT(
    11)=10                 :rem 64
770 ITEM$(12)="CLOTHING ":AMT(
    12)=25                :rem 242
780 ITEM$(13)="EDUCATION":AMT(
    13)=83                 :rem 61
790 ITEM$(14)="HOME REPR":AMT(
    14)=80                  :rem 3
800 ITEM$(15)="RECREAT'N":AMT(
    15)=60                 :rem 20
810 ITEM$(16)="SAVINGS
    {2 SPACES}":AMT(16)=100
                          :rem 226
820 ITEM$(17)="OTHER{4 SPACES}
    ":AMT(17)=45          :rem 36
830 REM *VIC* LEAVE OUT ITEM 1
    8 AND 19              :rem 239
840 ITEM$(18)="OTHER1
    {3 SPACES}":AMT(18)=23
                          :rem 85
850 ITEM$(19)="OTHER2
    {3 SPACES}":AMT(19)=17
                          :rem 92
860 BS$=CHR$(157):CU$=CHR$(145
    ):RV$=CHR$(18):RO$=CHR$(14
    6)                    :rem 201
870 GOTO250               :rem 111
```

All Commodore 64 programs in this issue work with the Commodore 128 in 64 mode.

Soft Write Protector

Article on page 97.

BEFORE TYPING . . .

Before typing in programs, please refer to "How To Type In COMPUTE!'s GAZETTE Programs," which appears before the Program Listings.

Program 1: File Protector

```
100 OPEN15,8,15,"I0":OPEN2,8,2
    ,"#":P$="LOCK":REM TO UNLO
    CK FILES, P$="UNLOCK"
                          :rem 64
110 T=18:S=0:NL$=CHR$(0):GOSUB
    230                   :rem 140
120 IFSN=255THENCLOSE2:CLOSE15
    :END                  :rem 154
130 T=TN:S=SN:GOSUB230:rem 129
140 FORJ=0TO7:R(J)=0:NEXT:PRIN
    T"{CLR}TYPE NUMBER OF FILE
    "                     :rem 120
150 PRINT"YOU WISH TO {RVS}";P
    $;"{OFF}"              :rem 20
160 FORJ=0TO7:FT(J)=J*32+2:PRI
    NT#15,"B-P";2;FT(J):GET#2,
    PS$:PS(J)=ASC(PS$+NL$)
                          :rem 60
170 IFPS(J)<>0THENR(J)=1:GOSUB
    250:D=J:GOSUB360:IFFL=1THE
    NJ=7                  :rem 248
180 NEXTJ:GOSUB370        :rem 118
190 GETB$:IFB$=""THEN190
                          :rem 89
200 B=VAL(B$):IFB=TETHEN120
                          :rem 78
210 IFR(B)=0THEN190       :rem 61
220 GOSUB300:GOTO190      :rem 180
230 PRINT#15,"U1";2;0;T;S:GOSU
    B380                  :rem 235
240 GET#2,TN$,SN$:TN=ASC(TN$+N
    L$):SN=ASC(SN$+NL$):RETURN
                          :rem 166
250 GET#2,J$:GET#2,J$:C=0:F$(J
    )=""                   :rem 25
260 GET#2,A$:A=ASC(A$+NL$)
                          :rem 140
270 IFA<>160ANDA<>0THENF$(J)=F
    $(J)+A$:C=C+1:IFC<17THEN26
    0                     :rem 14
280 TE=J+1:IFA=0THENFL=1
                          :rem 188
290 RETURN                :rem 123
300 PRINT#15,"B-P";2;FT(B)
                          :rem 173
310 IFP$="LOCK"THENPS(B)=PS(B)
    OR64:PRINT#2,CHR$(PS(B));:
```

```
    GOSUB380:GOTO330   :rem 141
320 PS(B)=PS(B)AND191:PRINT#2,
    CHR$(PS(B));:GOSUB380
                       :rem 12
330 PRINT#15,"U2";2;0;T;S:GOSU
    B380               :rem 237
340 PRINT"{HOME}{DOWN}":FORK=0
    TO7:IFR(K)=1THEND=K:GOSUB3
    60                 :rem 178
350 NEXTK:GOSUB370:RETURN
                       :rem 144
360 X=(PS(D)AND64)-4:X=X-(X<0)
    *36:PRINTDCHR$(X);F$(D):RE
    TURN               :rem 90
370 PRINTTE" {RVS}NEXT{OFF}":R
    ETURN              :rem 1
380 INPUT#15,EN,EM$,ET,ES
                       :rem 222
390 IFENTHENPRINTEN,EM$,ET,ES:
    STOP               :rem 248
400 RETURN             :rem 116
```

Program 2: Disk Protector

```
100 PRINT"{CLR}{RVS}DISK PROTE
    CTED"              :rem 220
110 OPEN15,8,15:PRINT#15,"I0":
    OPEN2,8,2,"#"      :rem 76
120 PRINT#15,"U1:";2;0;18;0:GO
    SUB170             :rem 18
130 PRINT#15,"B-P:";2;2:PRINT#
    2,CHR$(80);:GOSUB170
                       :rem 124
140 PRINT#15,"B-P:";2;166:PRIN
    T#2,CHR$(80);:GOSUB170
                       :rem 232
150 PRINT#15,"U2:";2;0;18;0:GO
    SUB170             :rem 22
160 CLOSE2:PRINT#15,"I0":CLOSE
    15:END             :rem 159
170 INPUT#15,EN,EM$,ET,ES
                       :rem 219
180 IFENTHENPRINTEN,EM$,ET,ES:
    STOP               :rem 245
190 RETURN             :rem 122
```

Program 3: Disk Unprotector

```
100 PRINT"{CLR}{RVS}DISK UNPRO
    TECTED"            :rem 127
110 OPEN15,8,15:PRINT#15,"I0":
    OPEN2,8,2,"#"      :rem 76
120 PRINT#15,"U1:";2;0;18;0:GO
    SUB190             :rem 20
130 PRINT#15,"B-P:";2;2:PRINT#
    2,CHR$(65);:GOSUB190
                       :rem 129
140 PRINT#15,"B-P:";2;166:PRIN
    T#2,CHR$(65);:GOSUB190
                       :rem 237
150 PRINT#15,"M-W";CHR$(1);CHR
    $(1);CHR$(1);CHR$(65)
                       :rem 31
160 PRINT#15,"M-W";CHR$(2);CHR
    $(7);CHR$(1);CHR$(65)
                       :rem 39
170 PRINT#15,"U2:";2;0;18;0:GO
    SUB190             :rem 26
180 CLOSE2:PRINT#15,"I0":CLOSE
    15:END             :rem 161
190 INPUT#15,EN,EM$,ET,ES
                       :rem 221
200 IFENTHENPRINTEN,EM$,ET,ES:
    STOP               :rem 238
210 RETURN             :rem 115
```

All Commodore 64 programs in this issue work with the Commodore 128 in 64 mode.

Dragon's Den

Article on page 54.

BEFORE TYPING . . .

Before typing in programs, please refer to "How To Type In COMPUTE!'s GAZETTE Programs," which appears before the Program Listings.

```
100 Y=826:POKE53280,0:POKE5328
    1,0:PRINT"{CLR}{5 DOWN}{5
    {7 SPACES}D R A G O N ' S
    {3 SPACES}D E N"   :rem 237
110 PRINT"{10 DOWN}{4 SPACES}P
    LEASE WAIT WHILE MAZE IS D
    RAWN{RED}"         :rem 214
120 BO$="{39 SPACES}":X$="
    {HOME}{23 DOWN}"   :rem 154
130 F=831:G=832:H=829:C=3:DIMM
    $(10,11):FORI=1TO9:FORJ=1T
    O10                :rem 179
140 M$(I,J)=STR$(INT((7*RND(1)
    )+1))+STR$(INT((8*RND(1))+
    1)):NEXTJ,I        :rem 243
150 S=I+10:I=INT((8*RND(1))+1)
    :J=INT((9*RND(1))+1):GOTO5
    20                 :rem 233
160 PRINTX$"{RIGHT}{43};B$:B$=
    "":IFY$="M"THENPRINTTAB(18
    )"{UP}"SL          :rem 47
170 PRINT"{83}{2 UP} {RVS}C
    {OFF}HART {RVS}M{OFF}ARK
    {RVS}B{OFF}ACK";SS$"{RED}"
    :IFHS=1THEN1320    :rem 236
180 IFWT>100ORS<1THEN1180
                       :rem 252
190 GETY$:IFY$=""THEN190
                       :rem 135
200 IFDE=1ANDY$<>"B"THEN190
                       :rem 49
210 GOSUB1580:DE=0:PRINT"{UP}"
    SB$,SB$"{UP}":GOSUB1560:IF
    Y$="C"THEN1420     :rem 166
220 IFY$="M"THENGOSUB1530:GOSU
    B930:SL=SL+1:S=S-1:B$="BRE
    AD SLICES USED":GOTO160
                       :rem 69
230 IFTC=1THENTC=0     :rem 92
240 WT=WT+1:IFY$="L"ANDLD=1ORY
    $="R"ANDRD=1ORY$="A"ANDFD=
    1ORY$="B"THEN280   :rem 134
250 IFY$="T"THENPRINT"{HOME}
    {13 DOWN}"SPC(20)" {UP}"
                       :rem 214
260 IFY$="T"ANDTD=1THEN960
                       :rem 32
270 GOTO160            :rem 105
280 SAF=I:FAS=J:TD=0:LD=0:RD=0
    :FD=0:IFY$="B"THENTC=1
                       :rem 182
290 IFTB=1THEN470      :rem 248
300 IFLT=1THEN370      :rem 249
310 IFRT=1THEN420      :rem 252
320 TB=0:LT=0:RT=0:IFY$="L"THE
    NJ=J-1:LT=1:C=1    :rem 208
330 IFY$="R"THENJ=J+1:RT=1:C=2
                       :rem 11
340 IFY$="A"THENI=I-1:C=3
                       :rem 174
350 IFY$="B"THENI=I+1:TB=1:C=4
                       :rem 237
360 GOTO510            :rem 104
370 TB=0:LT=0:RT=0:IFY$="L"THE
    NI=I+1:TB=1:C=4    :rem 202
380 IFY$="R"THENI=I-1:C=3
                       :rem 195
390 IFY$="A"THENJ=J-1:LT=1:C=1
                       :rem 251
400 IFY$="B"THENJ=J+1:RT=1:C=2
                       :rem 249
410 GOTO510            :rem 100
420 TB=0:LT=0:RT=0:IFY$="L"THE
    NI=I-1:C=3         :rem 137
430 IFY$="R"THENI=I+1:TB=1:C=4
                       :rem 252
440 IFY$="A"THENJ=J+1:RT=1:C=2
                       :rem 252
450 IFY$="B"THENJ=J-1:LT=1:C=1
                       :rem 249
460 GOTO510            :rem 105
470 TB=0:LT=0:RT=0:IFY$="L"THE
    NJ=J+1:RT=1:C=2    :rem 219
480 IFY$="R"THENJ=J-1:LT=1:C=1
                       :rem 12
490 IFY$="A"THENI=I+1:TB=1:C=4
                       :rem 241
500 IFY$="B"THENI=I-1:C=3
                       :rem 173
510 SS$="":GOTO790     :rem 244
520 PRINT"{CLR}":FORIJ=1TO20:P
    RINT"{15 +3}"SPC(10)"{14 +3
    ":NEXTIJ           :rem 227
530 PRINT"{HOME}":FORII=1TO4:P
    RINTTAB(15)"{RVS}{R3}{E3}{R3
    {E3}{R3}{E3}{R3}{E3}{R3}{E3
    {DOWN}{10 LEFT}{E3}{R3}{E3
    {R3}{E3}{R3}{E3}{R3}{E3}{R3}":NEX
    TII                :rem 59
540 PZ=12:ZP=15:FORIJ=1TO12:ZP
    =ZP-1:FORJI=1TOPZ  :rem 42
550 PRINTTAB(ZP)" ";:NEXTJI:PZ
    =PZ+2:PRINT:NEXTIJ:PRINT"
    {HOME}{8 DOWN}"    :rem 37
560 JJ=8:FORII=14TO3STEP-1:JJ=
    JJ+2               :rem 101
570 PRINTTAB(II)"£"SPC(JJ)"
    {*3}":NEXTII       :rem 201
580 PRINTLEFT$(X$,19)TAB(16)"
    {4 SPACES}":PRINTTAB(17)"
    {4 SPACES}":PRINTLEFT$(X$,
    19);               :rem 254
590 IFC=3THENPRINTTAB(17)"{83}N
    {RED}":PRINTTAB(17)"↑"
                       :rem 110
600 IFC=4THENPRINTTAB(17)"V":P
    RINTTAB(17)"{83}N{RED}"
                       :rem 95
610 IFC=1THENPRINTTAB(16)"{83}C
    >{RED}N"           :rem 108
620 IFC=2THENPRINTTAB(16)"N{83}
    <C{RED}"           :rem 108
630 IFI>9ORJ>10ORI<1ORJ<1THENS
    AF=I:FAS=J:GOTO760 :rem 91
640 MM=VAL(LEFT$(M$(I,J),2)):O
    NMMGOTO650,660,670,680,690
    ,700,710,760       :rem 223
650 GOSUB850           :rem 184
660 GOSUB770           :rem 186
670 GOSUB880:GOTO720   :rem 201
680 GOSUB850           :rem 187
690 GOSUB770:GOTO720   :rem 201
700 GOSUB880           :rem 183
710 GOSUB850           :rem 181
720 IFRIGHT$(M$(I,J),2)="22"TH
    ENGOSUB930         :rem 42
730 IFMM>4THENGOSUB940:rem 129
740 IFVAL(MID$(M$(I,J),4,1))<6
    THENGOSUB1260      :rem 213
750 GOTO160            :rem 108
760 GOSUB1580:PRINTX$SPC(11);"
    {UP}{RVS}DEAD END{OFF} GO
    {SPACE}{RVS}B{OFF}ACK!":DE
    =1:GOTO180         :rem 9
770 PRINTLEFT$(X$,10):FORGI=1T
    O4:PRINTTAB(18)"{2 UP}
    {4 SPACES}":NEXT   :rem 1
780 PRINTTAB(18)"{2 UP}£
    {2 SPACES}{*3}":FD=1:PQ=19:
    SS$=SS$+" {RVS}A{OFF}HEAD"
    :GOTO920           :rem 222
```

```
790 PRINT"{HOME}":FORII=1TO4:P
    RINTTAB(15)"{RVS}{R}{E}{R}
    {E}{R}{E}{R}{E}{R}{E}
    {DOWN}{10 LEFT}{E}{R}{E}
    {R}{E}{R}{E}{R}{E}{R}":NEX
    TII                    :rem 67
800 PRINT"{HOME}{8 DOWN}":FORI
    =1TO8:PRINTTAB(15)"
    {10 SPACES}":NEXTII
                           :rem 164
810 PRINT"{HOME}{4 DOWN}":FORG
    I=1TO9:PRINTTAB(6)"{4 +}":
    NEXT:LD=0:PRINTTAB(6)"
    {3 +}£"                :rem 113
820 PRINTTAB(6)"{2 +}£":PRINT
    TAB(6)"{+}£":PRINTTAB(6)"
    £"                     :rem 136
830 PRINT"{HOME}{4 DOWN}":FORG
    I=1TO9:PRINTTAB(30)"{4 +}"
    :NEXT:RD=0:PRINTTAB(30)"
    {*}{3 +}"              :rem 9
840 PRINTTAB(31)"{*}{2 +}":PRI
    NTTAB(32)"{*}{+}":PRINTTAB
    (33)"{*}":GOTO580 :rem 201
850 PRINTLEFT$(X$,19):FORGI=1T
    O3:PRINTTAB(6)"{2 UP}
    {4 SPACES}":NEXT   :rem 213
860 FORGI=1TO8:PRINTTAB(6)"
    {2 UP}{4 T}":NEXT:LD=1
                           :rem 38
870 SS$=SS$+" {RVS}L{OFF}EFT":
    QP=6:PQ=7:GOTO910  :rem 88
880 PRINTLEFT$(X$,19):FORGI=1T
    O3:PRINTTAB(30)"{2 UP}
    {4 SPACES}":NEXT:RD=1
                           :rem 67
890 FORGI=1TO8:PRINTTAB(30)"
    {2 UP}{4 T}":NEXT:LD=1
                           :rem 86
900 SS$=SS$+" {RVS}R{OFF}IGHT"
    :QP=30:PQ=31       :rem 242
910 PRINTTAB(QP)"{2 UP}£{2 T}
    {*}"               :rem 36
920 PRINTTAB(PQ)"{2 UP}£{*}":
    RETURN             :rem 249
930 PRINTLEFT$(X$,16)TAB(20)"
    {8}U*I{DOWN}{3 LEFT}{Z}*
    {X}{RED}":RETURN   :rem 231
940 PRINTLEFT$(X$,13)TAB(17)"N
    {5 T}M":PRINTTAB(16)"N
    {3 SPACES}W{3 SPACES}M"
                           :rem 128
950 PRINTTAB(16)"{9 U}":TD=1:S
    S$=SS$+" {RVS}T{OFF}RAP":R
    ETURN              :rem 37
960 PRINT"{HOME}{9 DOWN}"TAB(1
    6)"{9 O}":PRINTTAB(16)"M
    {7 SPACES}N"       :rem 165
970 PRINTTAB(17)"M{5 SPACES}N"
                           :rem 156
980 SS=LEN(SS$):SS$=LEFT$(SS$,
    SS-6)              :rem 94
990 FE=FE+1:           :rem 139
1000 ONINT((9*RND(1))+1)GOTO11
    50,1010,1010,1150,1030,10
    10,1140,1010,1160,1030
                           :rem 129
1010 B$="{RVS}YOU HEAR SCALES
    {SPACE}RATTLING-RUN!":HS=
    1:PRINTLEFT$(X$,14)TAB(18
    )"* *"             :rem 27
1020 GOTO160           :rem 147
1030 IFFE<20THEN1010   :rem 109
1040 Y$="":PRINTX$"{UP}
    {3 SPACES}{8}YOU FOUND AN
     EXIT! {RVS}E{OFF}SCAPE O
    R {RVS}H{OFF}UNT?":FE=5
                           :rem 40
1050 GETY$:IFY$=""THEN1050
                           :rem 223
1060 IFY$="H"THENPRINT"{UP}"SB
    $:GOTO160          :rem 240
1070 IFY$<>"E"THEN1040:rem 203
1080 PRINT"{CLR}{7 DOWN}{8}
    {5 SPACES}YOU FOUND AN EX
    IT! AND ESCAPED":IFGL=0TH
    EN1200             :rem 37
1090 PRINT"{DOWN}{10 SPACES}WI
    TH";GL;"GOLD POTS!":GOTO1
    200                :rem 248
1100 IFSW=0THENGOSUB1400
                           :rem 220
1110 IFSW=0THENPRINT"{CLR}
    {6 DOWN}{8}{5 SPACES}YOU'
    VE BEEN EATEN BY A DRAGON
    ":GOTO1200         :rem 16
1120 B$="{RVS}YOU FOUND A DRAG
    ON AND USED THE SWORD":SW
    =0                 :rem 247
1130 PRINTLEFT$(X$,14)TAB(18)"
    + +":GOTO160       :rem 52
1140 B$="{RVS}FOUND WATER, YOU
    'VE MORE TIME":WT=0:GOTO1
    60                 :rem 103
1150 B$="{RVS}NOTHING THERE":G
    OTO160             :rem 89
1160 IFSW=1THENB$="{RVS}YOU'VE
     FOUND GOLD!":GL=GL+1:GOT
    O160               :rem 28
1170 B$="{RVS}YOU'VE FOUND A O
    NE SHOT MAGIC SWORD!":SW=
    1:GOTO160          :rem 203
1180 IFS<1THENPRINT"{CLR}
    {4 DOWN}{8}{6 SPACES}SORR
    Y - YOU STARVED TO DEATH!
    ":GOTO1200         :rem 205
1190 PRINT"{CLR}{4 DOWN}{8}
    {7 SPACES}SORRY - YOU DIE
    D OF THIRST!":GOTO1200
                           :rem 183
1200 FORIJ=1TO100:NEXT:POKE594
    67,0               :rem 44
1210 PRINT"{4 DOWN}{12 SPACES}
    TRY AGAIN (Y/N)":AG$=""
                           :rem 198
1220 GETAG$:IFAG$=""THEN1220
                           :rem 59
1230 IFLEFT$(AG$,1)="Y"THENRUN
                           :rem 252
1240 IFLEFT$(AG$,1)<>"N"THEN12
    20                 :rem 255
1250 END               :rem 159
1260 ONVAL(MID$(M$(I,J),4,1))G
    OSUB1270,1280,1290,1300,1
    310:RETURN         :rem 91
1270 B$="{RVS}THE SMOKE SMELL
    {SPACE}IS STRONG":RETURN
                           :rem 51
1280 B$="{RVS}SOOT IS ON THE W
    ALLS":RETURN       :rem 192
1290 B$="{RVS}YOU CAN HEAR DRI
    PPING WATER!":RETURN
                           :rem 207
1300 B$="{RVS}BLOOD IS ON THE
    {SPACE}FLOOR":RETURN
                           :rem 227
1310 B$="{RVS}YOU HEAR BATS IN
     FLIGHT":RETURN    :rem 116
1320 VB=55:Y$="":HS=0:TD=0
                           :rem 190
1330 GETY$:VB=VB-1:IFVB<45THEN
    1380               :rem 42
1340 FORIJ=1TO7:NEXT       :rem 3
1350 IFY$="L"ANDLD=1ORY$="R"AN
    DRD=1ORY$="A"ANDFD=1ORY$=
    "B"THEN1370        :rem 193
1360 GOTO1330          :rem 202
1370 GOTO210           :rem 151
1380 IFSW>0THEN1120    :rem 102
1390 IFSW<=0THEN1100   :rem 160
1400 PRINTLEFT$(X$,12)TAB(19)"
    X*X":PRINTTAB(18)"(* *)":
    PRINTTAB(18)" JQK"
                           :rem 134
1410 PRINTTAB(17)"<<<><>>>":FO
    RIJ=1TO1500:NEXT:RETURN
                           :rem 45
1420 SS$="":PRINT"{CLR}{PUR}"T
    AB(14)"{10 @}      :rem 99
1430 FORIJ=1TO9:PRINTTAB(13)"
    {OFF}{M}";:FORJI=1TO10
                           :rem 189
1440 MM$=RIGHT$(M$(IJ,JI),2):I
    FIJ=IANDJI=JTHENPRINT"
    {OFF}↑";:GOTO1480 :rem 99
1450 IFMM$="-2"THENPRINT"{OFF}
    L";:GOTO1480       :rem 208
1460 IFMM$="22"THENPRINT"{RVS}
    M";:GOTO1480       :rem 215
1470 PRINT"{RVS} ";    :rem 234
1480 NEXTJI:PRINT"{OFF}{G}":NE
    XTIJ:PRINTTAB(14)"{10 T}
    {RED}"             :rem 255
1490 PRINT"{3 DOWN}{7 SPACES}
    {WHT}PRESS ANY KEY TO RET
    URN":PRINTTAB(11)"{DOWN}T
    O THE DUNGEON{RED}"
                           :rem 14
1500 GETY$:IFY$=""THEN1500
                           :rem 223
1510 IFRIGHT$(M$(I,J),2)="-2"O
    RRIGHT$(M$(I,J),2)="22"TH
    EN520              :rem 38
1520 M$(I,J)=M$(I,J)+"-2":GOTO
    520                :rem 223
1530 IFRIGHT$(M$(I,J),2)="-2"T
    HENM$(I,J)=M$(I,J)+"2":RE
    TURN               :rem 51
1540 IFRIGHT$(M$(I,J),2)="22"T
    HENRETURN          :rem 31
1550 M$(I,J)=M$(I,J)+"22":RETU
    RN                 :rem 247
1560 IFRIGHT$(M$(I,J),2)="-2"O
    RRIGHT$(M$(I,J),2)="22"TH
    ENRETURN           :rem 116
1570 M$(I,J)=M$(I,J)+"-2":RETU
    RN                 :rem 244
1580 PRINTLEFT$(X$,23);BO$:PRI
    NTX$BO$:RETURN     :rem 10
```

All Commodore 64 programs in this issue work with the Commodore 128 in 64 mode.

Whirlybird

See instructions in article on page 42 before typing in.

```
49152 :027,008,000,000,158,050,243
49158 :048,054,049,000,000,000,157
49164 :169,147,032,210,255,162,219
49170 :000,142,033,208,142,032,063
49176 :208,232,142,027,208,169,242
49182 :003,141,134,002,162,016,232
49188 :169,000,157,000,208,202,004
49194 :016,248,162,024,157,000,137
49200 :212,202,016,250,162,024,146
49206 :189,243,019,157,000,212,106
49212 :202,016,247,169,127,141,194
49218 :013,220,169,051,133,001,141
49224 :169,000,133,251,169,208,234
49230 :133,252,169,000,133,253,250
49236 :169,056,133,254,160,000,088
49242 :177,251,145,253,230,251,117
49248 :208,002,230,252,230,253,247
49254 :208,002,230,254,056,165,249
49260 :252,201,216,144,233,169,043
49266 :055,133,001,169,129,141,230
49272 :013,220,162,008,189,136,080
49278 :019,157,208,058,189,144,133
49284 :019,157,080,059,189,152,020
```

```
49290 :019,157,080,057,202,016,157
49296 :235,169,031,141,024,208,184
49302 :169,201,133,251,169,016,065
49308 :133,252,169,000,133,253,072
49314 :169,060,133,254,160,000,170
49320 :177,251,145,253,230,251,195
49326 :208,002,230,252,230,253,069
49332 :208,002,230,254,056,165,071
49338 :251,233,136,165,252,233,176
49344 :019,144,229,120,169,155,004
49350 :141,020,003,169,015,141,175
49356 :021,003,088,169,240,141,098
49362 :060,003,169,000,141,087,158
49368 :003,141,088,003,032,000,227
49374 :010,169,020,141,011,212,017
49380 :169,021,141,011,212,032,046
49386 :132,014,173,098,003,240,126
49392 :248,206,098,003,169,001,197
49398 :141,081,003,169,000,141,013
49404 :095,003,173,087,003,013,114
49410 :088,003,233,010,144,020,244
49416 :056,173,087,003,233,010,058
49422 :141,087,003,173,088,003,253
49428 :233,000,141,088,003,032,005
49434 :236,013,032,130,016,173,114
49440 :000,220,041,016,208,246,251
49446 :032,188,011,032,171,012,228
49452 :173,070,003,208,008,169,163
49458 :000,141,104,003,076,068,186
49464 :009,173,104,003,208,005,046
49470 :169,001,141,104,003,032,000
49476 :085,014,173,091,003,208,130
49482 :018,032,192,013,032,192,041
49488 :013,032,192,013,032,192,042
49494 :013,032,192,013,076,234,134
49500 :008,173,085,003,240,050,139
49506 :032,253,012,032,177,011,103
49512 :173,000,220,041,015,201,242
49518 :011,240,007,201,007,240,048
49524 :011,076,134,009,169,000,003
49530 :141,083,003,076,134,009,056
49536 :169,001,141,083,003,032,045
49542 :192,013,032,021,010,162,052
49548 :001,142,081,003,138,076,069
49554 :151,009,169,000,141,086,190
49560 :003,032,021,010,032,252,246
49566 :011,173,099,003,240,003,175
49572 :076,237,008,173,000,220,110
49578 :041,015,201,011,240,036,202
49584 :201,007,240,024,173,070,123
49590 :003,208,003,076,045,009,014
49596 :206,100,003,173,100,003,005
49602 :208,045,169,003,141,100,092
49608 :003,076,239,009,173,065,253
49614 :003,208,008,076,234,009,232
49620 :173,065,003,208,016,173,082
49626 :070,003,201,012,144,003,139
49632 :076,045,009,238,070,003,153
49638 :076,045,009,173,070,003,094
49644 :240,006,206,070,003,076,069
49650 :045,009,173,065,003,073,098
49656 :001,141,065,003,076,045,067
49662 :009,169,155,141,007,212,179
49668 :169,003,141,008,212,169,194
49674 :011,141,000,212,169,007,038
49680 :141,001,212,096,238,071,007
49686 :003,173,071,003,208,248,216
49692 :238,072,003,173,072,003,077
49698 :201,015,144,238,169,000,033
49704 :141,072,003,096,169,192,201
49710 :141,073,003,169,007,141,068
49716 :074,003,169,080,133,003,002
49722 :169,004,133,004,169,106,131
49728 :141,075,003,169,013,141,094
49734 :076,003,032,084,011,169,189
49740 :231,141,073,003,169,007,188
49746 :141,074,003,169,119,133,209
49752 :003,169,004,133,004,169,058
49758 :106,141,075,003,032,084,023
49764 :011,169,249,133,003,169,066
49770 :006,133,004,169,030,141,077
49776 :073,003,169,007,141,074,067
49782 :003,169,090,141,075,003,087
49788 :169,007,141,076,003,032,040
49794 :134,011,169,033,133,003,101
49800 :169,007,133,004,169,070,176
49806 :141,073,003,169,007,141,164
49812 :074,003,169,006,141,076,105
49818 :003,032,134,011,169,073,064
49824 :133,003,169,007,133,004,097
49830 :169,110,141,073,003,169,063
49836 :007,141,074,003,169,005,059
49842 :141,076,003,032,134,011,063
49848 :169,113,133,003,169,007,010
49854 :133,004,169,150,141,073,092
49860 :003,169,007,141,074,003,081
49866 :169,007,141,076,003,032,118
49872 :134,011,169,153,133,003,043
49878 :169,007,133,004,169,190,118
49884 :141,073,003,169,007,141,242
49890 :074,003,169,006,141,076,183
49896 :003,032,134,011,169,193,006
49902 :133,003,169,007,133,004,175
49908 :169,230,141,073,003,169,005
49914 :007,141,074,003,169,003,135
49920 :141,076,003,032,134,011,141
49926 :169,087,141,002,007,141,041
49932 :021,007,141,119,007,141,192
49938 :144,007,141,196,007,141,142
49944 :202,007,141,208,007,141,218
49950 :088,007,141,096,007,141,254
49956 :215,007,141,221,007,141,000
49962 :227,007,169,001,141,002,077
49968 :219,141,021,219,141,119,140
49974 :219,141,144,219,141,196,090
49980 :219,141,202,219,141,208,166
49986 :219,141,215,219,141,088,065
49992 :219,141,096,219,141,221,085
49998 :219,141,227,219,096,160,116
50004 :000,173,075,003,145,003,227
50010 :165,003,133,005,024,165,073
50016 :004,105,212,133,006,173,217
50022 :076,003,145,005,024,165,008
50028 :003,105,040,133,003,165,045
50034 :004,105,000,133,004,056,160
50040 :173,073,003,229,003,173,006
50046 :074,003,229,004,176,209,053
50052 :096,160,000,173,075,003,127
50058 :145,003,165,003,133,005,080
50064 :024,165,004,105,212,133,019
50070 :006,173,076,003,145,005,046
50076 :230,003,208,002,230,004,065
50082 :056,173,073,003,229,003,187
50088 :173,074,003,229,004,176,059
50094 :216,096,169,032,160,000,079
50100 :145,251,169,001,145,253,120
50106 :096,032,248,011,201,035,041
50112 :176,249,141,079,003,024,096
50118 :169,202,109,079,003,133,125
50124 :251,169,004,105,000,133,098
50130 :252,024,165,251,105,000,239
50136 :133,253,165,252,105,212,056
50142 :133,254,169,001,141,081,233
50148 :003,032,248,011,048,007,065
50154 :169,000,141,083,003,240,102
50160 :005,169,001,141,083,003,130
50166 :096,173,027,212,096,169,251
50172 :000,141,099,003,032,177,192
50178 :011,173,083,003,208,022,246
50184 :032,053,012,160,000,177,186
50190 :251,201,106,240,002,208,254
50196 :059,032,067,012,032,228,194
50202 :012,076,252,011,032,067,220
50208 :012,160,000,177,251,201,065
50214 :106,240,002,208,037,032,151
50220 :053,012,032,228,012,076,201
50226 :252,011,056,165,251,233,250
50232 :001,133,251,165,252,233,067
50238 :000,133,252,096,024,165,220
50244 :251,105,001,133,251,165,206
50250 :252,105,000,133,252,096,144
50256 :165,251,133,170,165,252,192
50262 :133,171,173,081,003,208,087
50268 :027,056,165,251,233,081,137
50274 :165,252,233,004,144,090,218
50280 :056,165,251,233,040,133,214
50286 :251,165,252,233,000,133,120
50292 :252,076,145,012,056,165,054
50298 :251,233,192,165,252,233,168
50304 :007,176,077,024,165,251,060
50310 :105,040,133,251,165,252,056
50316 :105,000,133,252,177,251,034
50322 :201,087,208,003,076,024,233
50328 :013,201,090,240,007,201,136
50334 :106,240,066,076,171,012,061
50340 :032,217,012,032,065,014,024
50346 :160,000,169,042,145,251,169
50352 :024,165,251,105,000,133,086
50358 :253,165,252,105,212,133,022
50364 :254,169,001,145,253,096,082
50370 :169,001,141,081,003,141,218
50376 :099,003,169,000,141,070,170
50382 :003,096,169,000,141,081,184
50388 :003,076,253,012,173,081,042
50394 :003,073,001,141,081,003,008
50400 :076,253,012,173,083,003,056
50406 :073,001,141,083,003,076,095
50412 :253,012,056,165,251,233,182
50418 :040,133,251,165,252,233,036
50424 :000,133,252,096,169,064,194
50430 :141,004,212,032,130,016,021
50436 :169,180,141,094,003,169,248
50442 :001,141,093,003,141,095,228
50448 :003,169,065,141,004,212,098
50454 :096,032,000,010,169,003,076
50460 :141,070,003,169,002,141,042
50466 :032,208,141,033,208,032,176
50472 :177,011,032,130,016,238,132
50478 :001,208,238,001,208,173,107
50484 :001,208,141,001,212,201,048
50490 :233,144,002,176,005,173,023
50496 :085,003,240,230,032,253,139
50502 :012,032,248,011,201,032,094
50508 :176,249,141,079,003,169,125
50514 :172,133,176,169,006,133,103
50520 :177,160,000,024,165,176,022
50526 :109,079,003,133,176,165,247
50532 :177,105,000,133,177,177,101
50538 :176,201,106,240,216,200,221
50544 :192,005,208,245,160,002,156
50550 :169,106,145,176,024,165,135
50556 :176,105,000,133,176,165,111
50562 :177,105,212,133,177,169,079
50568 :003,145,176,160,000,173,025
50574 :001,208,201,060,144,018,006
50580 :032,130,016,206,001,208,229
50586 :206,001,208,173,001,208,183
50592 :141,001,212,076,142,013,233
50598 :173,031,208,169,000,141,120
50604 :032,208,141,033,208,141,167
50610 :085,003,032,253,012,104,155
50616 :104,032,000,010,076,029,179
50622 :009,024,173,087,003,105,079
50628 :010,141,087,003,173,088,186
50634 :003,105,000,141,088,003,030
50640 :056,173,087,003,237,012,008
50646 :020,173,088,003,237,013,236
50652 :020,144,012,173,087,003,147
50658 :141,012,020,173,088,003,151
50664 :141,013,020,169,019,032,114
50670 :210,255,162,011,169,032,053
50676 :157,000,004,202,016,250,105
50682 :169,029,032,210,255,169,090
50688 :029,032,210,255,174,087,019
50694 :003,173,088,003,032,205,254
50700 :189,169,032,032,210,255,131
50706 :169,160,160,019,032,030,076
50712 :171,174,012,020,173,013,075
50718 :020,032,205,189,169,032,165
50724 :032,210,255,169,208,160,046
50730 :019,032,030,171,174,098,054
50736 :003,169,000,032,205,189,134
50742 :169,032,032,210,255,169,153
50748 :032,076,210,255,024,173,062
50754 :087,003,105,001,141,087,234
50760 :003,173,088,003,105,000,188
50766 :141,088,003,076,209,013,096
50772 :169,000,141,091,003,133,109
50778 :170,169,004,133,171,160,129
50784 :000,177,170,201,090,240,206
50790 :022,201,087,240,018,230,132
50796 :170,208,002,230,171,056,177
50802 :165,170,233,230,165,171,224
50808 :233,007,144,229,096,169,230
50814 :001,141,091,003,096,032,234
50820 :000,010,173,014,020,141,234
50826 :098,003,169,003,141,100,140
50832 :003,169,147,032,210,255,192
50838 :169,000,141,021,208,032,209
50844 :045,010,032,236,013,169,149
50850 :001,141,029,208,169,061,003
50856 :141,001,208,169,243,141,047
50862 :248,007,141,060,003,169,034
50868 :006,141,062,003,169,002,051
50874 :141,070,003,169,001,141,199
50880 :081,003,141,083,003,169,160
50886 :080,141,063,003,141,000,114
50892 :208,169,000,141,064,003,021
50898 :141,016,208,141,065,003,016
50904 :162,008,189,181,019,157,164
```

```
50910 :077,005,169,003,157,077,198
50916 :217,189,190,019,157,117,093
50922 :005,169,003,157,117,217,134
50928 :189,199,019,157,157,005,198
50934 :169,003,157,157,217,202,127
50940 :016,220,169,034,141,068,132
50946 :003,169,000,141,069,003,131
50952 :169,032,141,066,003,169,076
50958 :001,141,067,003,169,001,140
50964 :141,021,208,032,130,016,056
50970 :173,000,220,041,015,201,164
50976 :014,240,007,201,013,240,235
50982 :012,076,061,015,238,098,026
50988 :003,032,040,014,076,055,008
50994 :015,206,098,003,032,040,188
51000 :014,032,021,010,165,197,239
51006 :201,004,240,011,201,005,212
51012 :240,020,201,003,240,073,077
51018 :076,024,015,169,000,141,243
51024 :092,003,169,001,141,029,003
51030 :208,076,121,015,169,001,164
51036 :141,092,003,169,000,141,126
51042 :029,208,169,032,141,068,233
51048 :003,169,000,141,069,003,233
51054 :169,055,141,066,003,169,201
51060 :001,141,067,003,162,008,242
51066 :169,032,157,077,005,157,207
51072 :117,005,157,157,005,202,003
51078 :016,244,169,000,141,087,023
51084 :003,141,088,003,076,236,175
51090 :013,169,000,133,198,076,223
51096 :198,000,238,093,003,173,089
51102 :093,003,201,001,144,051,139
51108 :169,000,141,093,003,173,231
51114 :095,003,208,023,238,094,063
51120 :003,238,094,003,173,094,013
51126 :003,201,250,176,002,144,190
51132 :026,169,001,141,095,003,111
51138 :076,216,015,206,094,003,036
51144 :206,094,003,173,094,003,005
51150 :201,050,176,005,169,000,039
51156 :141,095,003,173,094,003,209
51162 :141,022,212,173,031,208,237
51168 :141,085,003,173,070,003,187
51174 :074,141,062,003,173,061,232
51180 :003,205,062,003,176,006,179
51186 :238,061,003,076,024,016,148
51192 :169,000,141,061,003,173,027
51198 :060,003,201,249,176,012,187
51204 :238,060,003,173,060,003,029
51210 :141,248,007,076,024,016,010
51216 :169,240,141,060,003,208,069
51222 :237,173,065,003,240,043,015
51228 :056,173,063,003,237,066,114
51234 :003,173,064,003,237,067,069
51240 :003,176,021,024,173,063,244
51246 :003,109,070,003,141,063,179
51252 :003,173,064,003,105,000,144
51258 :141,064,003,076,115,016,217
51264 :169,000,141,065,003,240,170
51270 :043,056,173,068,003,237,138
51276 :063,003,173,069,003,237,112
51282 :064,003,240,023,176,021,097
51288 :056,173,063,003,237,070,178
51294 :003,141,063,003,173,064,029
51300 :003,233,000,141,064,003,032
51306 :076,115,016,169,001,141,112
51312 :065,003,173,063,003,141,048
51318 :000,208,173,064,003,141,195
51324 :016,208,076,049,234,162,101
51330 :023,160,000,169,080,133,183
51336 :176,169,216,133,177,169,152
51342 :119,133,180,169,216,133,068
51348 :181,173,027,212,041,015,029
51354 :201,000,240,247,201,002,021
51360 :240,243,201,011,240,239,054
51366 :145,176,145,180,024,165,233
51372 :176,105,040,133,176,165,199
51378 :177,105,000,133,177,024,026
51384 :165,180,105,040,133,180,219
51390 :165,181,105,000,133,181,187
51396 :202,016,206,096,000,000,204
51402 :000,000,000,000,000,000,202
51408 :000,000,000,000,000,000,208
51414 :000,000,000,000,000,024,238
51420 :000,008,024,016,030,024,066
51426 :120,063,153,252,103,255,148
51432 :230,064,255,002,128,060,203
51438 :001,000,060,000,000,024,067
51444 :000,000,024,000,001,255,012
51450 :128,000,000,000,000,000,122
51456 :000,000,000,000,000,000,000
51462 :000,000,000,000,000,000,006
51468 :000,000,000,000,000,000,012
51474 :000,000,000,000,000,000,018
51480 :000,000,000,028,000,004,056
51486 :024,032,014,024,112,031,011
51492 :153,248,055,255,236,096,055
51498 :255,006,064,060,002,000,173
51504 :060,000,000,024,000,000,132
51510 :024,000,000,255,000,000,077
51516 :000,000,000,000,000,000,060
51522 :000,000,000,000,000,000,066
51528 :000,000,000,000,000,000,072
51534 :000,000,000,000,000,000,078
51540 :000,000,000,000,000,000,084
51546 :000,028,000,002,024,000,144
51552 :007,024,224,015,217,240,055
51558 :031,255,248,056,255,028,207
51564 :048,060,012,000,060,000,032
51570 :000,024,000,000,024,000,162
51576 :000,126,000,000,000,000,246
51582 :000,000,000,000,000,000,126
51588 :000,000,000,000,000,000,132
51594 :000,000,000,000,000,000,138
51600 :000,000,000,000,000,000,144
51606 :000,000,000,000,000,030,180
51612 :000,003,024,000,007,152,086
51618 :128,015,219,224,015,255,250
51624 :240,028,126,056,024,060,190
51630 :024,000,060,000,000,024,026
51636 :000,000,024,000,000,060,008
51642 :000,000,000,000,000,000,186
51648 :000,000,000,000,000,000,192
51654 :000,000,000,000,000,000,198
51660 :000,000,000,000,000,000,204
51666 :000,000,000,000,000,000,210
51672 :000,000,000,030,000,000,246
51678 :092,000,000,249,000,001,052
51684 :255,128,003,255,192,007,044
51690 :126,224,006,060,224,000,106
51696 :060,000,000,024,000,000,068
51702 :024,000,000,008,000,000,022
51708 :000,000,000,000,000,000,252
51714 :000,000,000,000,000,000,002
51720 :000,000,000,000,000,000,008
51726 :000,000,000,000,000,000,014
51732 :000,000,000,000,000,000,020
51738 :000,024,000,000,024,000,074
51744 :000,060,000,000,060,000,152
51750 :000,126,000,000,126,000,034
51756 :000,126,000,000,060,000,230
51762 :000,024,000,000,024,000,098
51768 :000,024,000,000,000,000,080
51774 :000,000,000,000,000,000,062
51780 :000,000,000,000,000,000,068
51786 :000,000,000,000,000,000,074
51792 :000,000,000,000,000,000,080
51798 :000,000,000,000,000,120,206
51804 :000,000,058,000,000,159,053
51810 :000,001,255,128,003,255,228
51816 :192,007,126,224,007,060,208
51822 :096,000,060,000,000,024,034
51828 :000,000,024,000,000,016,156
51834 :000,000,000,000,000,000,122
51840 :000,000,000,000,000,000,128
51846 :000,000,000,000,000,000,134
51852 :000,000,000,000,000,000,140
51858 :000,000,000,000,000,000,146
51864 :000,000,000,120,000,000,016
51870 :024,192,001,025,224,007,119
51876 :219,240,015,255,240,028,137
51882 :126,056,024,060,024,000,204
51888 :060,000,000,024,000,000,004
51894 :024,000,000,060,000,000,010
51900 :000,000,000,000,000,000,188
51906 :000,000,000,000,000,000,194
51912 :000,000,000,000,000,000,200
51918 :000,000,000,000,000,000,206
51924 :000,000,000,000,000,000,212
51930 :000,056,000,000,024,064,106
51936 :007,024,224,015,155,240,121
51942 :031,255,248,056,255,028,079
51948 :048,060,012,000,060,000,160
51954 :000,024,000,000,024,000,034
51960 :000,126,000,000,000,000,118
51966 :000,000,000,000,000,000,254
51972 :000,000,000,000,000,000,004
51978 :000,000,000,000,000,000,010
51984 :000,000,000,000,000,000,016
51990 :000,000,000,000,000,056,078
51996 :000,004,024,032,014,024,126
52002 :112,031,153,248,055,255,120
52008 :236,096,255,006,064,060,245
52014 :002,000,060,000,000,024,132
52020 :000,000,024,000,000,255,075
52026 :000,000,000,000,000,000,058
52032 :000,000,000,000,000,000,064
52038 :000,000,000,000,000,000,070
52044 :000,000,000,000,000,000,076
52050 :000,000,000,000,000,000,082
52056 :000,000,000,024,000,008,120
52062 :024,016,030,024,120,063,115
52068 :153,252,103,255,230,064,133
52074 :255,002,128,060,001,000,040
52080 :060,000,000,024,000,000,196
52086 :024,000,001,255,128,000,014
52092 :000,000,000,000,000,000,124
52098 :000,000,000,000,000,255,129
52104 :255,195,195,195,195,255,146
52110 :255,255,060,024,024,024,016
52116 :024,060,255,000,060,126,161
52122 :255,255,126,060,000,019,101
52128 :029,029,029,029,029,029,078
52134 :029,029,029,029,029,029,084
52140 :029,072,073,071,072,058,035
52146 :032,000,006,049,032,014,055
52152 :015,018,013,001,012,006,249
52158 :051,032,005,024,016,005,067
52164 :018,020,006,055,032,017,088
52170 :021,009,020,032,032,019,079
52176 :029,029,029,029,029,029,126
52182 :029,029,029,029,029,029,132
52188 :029,029,029,029,029,029,138
52194 :029,029,029,029,029,029,144
52200 :029,029,029,069,071,071,018
52206 :083,058,032,000,011,007,173
52212 :005,200,064,010,000,155,166
52218 :003,005,200,020,015,240,221
52224 :255,255,000,000,128,000,126
52230 :000,000,100,243,063,000,156
52236 :000,010,013,013,013,013,074
```

All Commodore 64 programs in this issue work with the Commodore 128 in 64 mode.

Quickchange

See instructions in article on page 46 before typing in.

```
49152 :169,001,133,139,169,000,099
49158 :133,142,133,141,160,023,226
49164 :153,000,212,136,016,250,011
49170 :169,047,141,024,212,169,012
49176 :243,141,023,212,169,055,099
49182 :141,005,212,169,019,141,205
49188 :012,212,032,081,194,032,087
49194 :063,195,032,104,196,032,152
49200 :247,193,032,122,198,169,241
49206 :000,141,167,002,141,178,171
49212 :002,133,144,206,045,085,163
49218 :173,045,085,041,015,009,178
49224 :120,141,022,212,032,127,214
49230 :193,032,209,195,032,226,197
49236 :197,032,189,195,032,183,144
49242 :198,173,178,002,240,009,122
49248 :032,171,192,032,217,192,164
49254 :076,044,192,173,167,002,244
49260 :240,209,032,082,193,032,128
49266 :171,192,198,248,240,020,159
49272 :165,144,240,179,165,193,182
49278 :056,229,006,133,193,165,140
49284 :194,233,000,133,194,076,194
49290 :044,192,032,183,198,162,181
49296 :011,160,015,024,032,240,114
49302 :255,169,012,160,200,032,210
49308 :030,171,169,000,133,162,053
49314 :165,161,197,161,240,252,058
49320 :076,038,192,162,014,189,071
49326 :157,195,133,002,189,158,240
49332 :195,133,003,160,000,169,072
49338 :160,145,002,202,202,016,145
```

```
49344 :236,165,251,133,002,165,120
49350 :252,133,003,169,160,145,036
49356 :002,169,203,133,253,169,109
49362 :005,133,254,032,145,195,206
49368 :096,165,193,024,101,196,223
49374 :133,193,165,194,105,000,244
49380 :133,194,169,060,133,196,089
49386 :166,247,165,193,024,105,110
49392 :100,133,193,165,194,105,106
49398 :000,133,194,202,208,240,199
49404 :230,247,032,183,198,165,027
49410 :140,208,012,238,183,002,017
49416 :174,183,002,189,041,193,022
49422 :141,180,002,160,016,169,170
49428 :000,153,182,003,136,016,254
49434 :248,173,112,148,201,001,141
49440 :240,006,056,233,010,141,206
49446 :112,148,096,000,013,015,166
49452 :005,009,007,007,007,007,086
49458 :169,140,141,008,212,141,093
49464 :012,212,169,128,141,011,217
49470 :212,169,129,141,011,212,168
49476 :160,255,162,000,202,208,031
49482 :253,140,022,212,136,208,021
49488 :245,096,169,031,141,012,006
49494 :212,169,038,141,011,212,101
49500 :169,039,141,011,212,162,058
49506 :020,160,010,032,189,195,192
49512 :142,008,212,140,001,212,051
49518 :200,200,200,192,020,144,042
49524 :240,202,202,016,234,169,155
49530 :038,141,011,212,096,160,012
49536 :000,173,000,220,074,176,003
49542 :004,169,080,208,021,074,178
49548 :176,004,169,080,208,032,041
49554 :074,176,004,169,002,208,011
49560 :007,074,176,078,169,002,146
49566 :208,018,133,002,165,251,167
49572 :056,229,002,133,253,165,234
49578 :252,233,000,133,254,076,094
49584 :189,193,024,101,251,133,043
49590 :253,165,252,105,000,133,066
49596 :254,160,000,177,253,201,209
49602 :032,208,003,238,167,002,076
49608 :201,194,176,030,165,253,195
49614 :024,105,000,133,004,165,125
49620 :254,105,212,133,005,177,074
49626 :004,041,015,201,011,208,186
49632 :018,165,172,240,005,238,038
49638 :167,002,230,144,165,251,165
49644 :133,253,165,252,133,254,146
49650 :096,169,160,145,251,165,204
49656 :253,133,251,024,105,000,246
49662 :133,004,165,254,133,252,171
49668 :105,212,133,005,160,000,107
49674 :169,209,145,253,177,004,199
49680 :077,180,002,145,004,041,209
49686 :015,201,010,240,024,169,169
49692 :015,032,067,194,230,193,247
49698 :208,002,230,194,230,006,136
49704 :165,006,197,143,240,001,024
49710 :096,238,178,002,096,169,057
49716 :008,032,067,194,198,006,045
49722 :198,193,201,255,208,002,091
49728 :198,194,096,141,001,212,138
49734 :169,032,141,004,212,169,029
49740 :033,141,004,212,096,169,219
49746 :000,141,033,208,141,032,125
49752 :208,169,147,032,210,255,085
49758 :162,005,160,014,024,032,235
49764 :240,255,169,158,032,210,140
49770 :255,169,254,160,199,032,151
49776 :030,171,162,010,160,008,141
49782 :024,032,240,255,169,240,054
49788 :160,194,032,030,171,032,231
49794 :189,195,160,003,185,059,153
49800 :195,170,169,032,157,152,243
49806 :005,136,208,244,166,139,016
49812 :189,059,195,168,169,062,222
49818 :153,152,005,173,000,220,089
49824 :074,176,010,165,139,201,157
49830 :001,240,216,198,139,016,208
49836 :212,074,176,010,165,139,180
49842 :201,003,240,203,230,139,170
49848 :016,199,074,074,074,176,029
49854 :194,169,000,133,172,133,223
49860 :140,169,120,133,143,169,046
49866 :012,141,180,002,165,139,073
49872 :201,001,240,027,201,002,112
49878 :208,010,169,001,133,172,139
49884 :169,116,133,143,208,013,234
49890 :169,001,133,140,169,001,071
49896 :141,180,002,169,117,133,206
49902 :143,096,150,032,032,049,228
49908 :046,032,070,076,073,080,109
49914 :032,070,076,079,080,013,088
49920 :013,032,032,032,032,032,173
49926 :032,032,032,032,032,050,216
49932 :046,032,077,073,083,083,150
49938 :073,078,071,032,080,073,169
49944 :069,067,069,083,013,013,082
49950 :032,032,032,032,032,032,222
49956 :032,032,032,032,051,046,005
49962 :032,078,079,032,084,085,176
49968 :082,078,073,078,071,032,206
49974 :066,065,067,075,000,000,071
49980 :000,080,160,032,145,195,160
49986 :169,071,141,112,148,169,108
49992 :255,141,015,212,169,128,224
49998 :141,018,212,169,203,133,186
50004 :253,169,005,133,254,160,034
50010 :016,169,000,153,060,003,235
50016 :153,182,003,136,016,247,065
50022 :133,193,133,194,141,183,055
50028 :002,169,015,133,168,169,252
50034 :003,133,169,162,015,032,116
50040 :205,197,202,016,250,169,135
50046 :060,133,196,169,011,133,060
50052 :195,169,001,133,247,141,250
50058 :114,148,169,003,133,248,185
50064 :096,160,015,185,173,195,200
50070 :153,157,195,136,016,247,030
50076 :096,205,004,029,005,109,092
50082 :005,189,005,013,006,093,217
50088 :006,173,006,253,006,205,049
50094 :004,029,005,109,005,189,003
50100 :005,013,006,093,006,173,220
50106 :006,253,006,138,072,152,045
50112 :072,174,112,148,160,000,090
50118 :136,208,253,202,208,248,173
50124 :104,168,104,170,096,162,240
50130 :014,222,082,003,208,027,254
50136 :189,102,003,157,082,003,240
50142 :189,157,195,133,004,133,009
50148 :002,189,158,195,133,005,142
50154 :133,003,169,160,145,004,080
50160 :189,182,003,208,107,189,094
50166 :060,003,208,016,165,004,190
50172 :024,105,002,133,004,165,173
50178 :005,105,000,133,005,076,070
50184 :023,196,165,004,056,233,173
50190 :002,133,004,165,005,233,044
50196 :000,133,005,177,004,201,028
50202 :209,208,005,238,167,002,087
50208 :208,048,201,194,240,025,180
50214 :165,004,024,105,000,133,213
50220 :170,165,005,105,212,133,066
50226 :171,177,170,041,015,201,057
50232 :011,208,023,165,172,208,075
50238 :019,165,002,133,004,165,038
50244 :003,133,005,189,060,003,205
50250 :073,001,157,060,003,032,144
50256 :205,197,165,004,157,157,197
50262 :195,165,005,157,158,195,193
50268 :169,032,145,004,202,202,078
50274 :048,003,076,211,195,096,215
50280 :169,186,160,196,032,030,109
50286 :171,169,008,133,002,169,250
50292 :000,133,006,169,231,160,047
50298 :196,032,030,171,198,002,239
50304 :208,245,169,127,160,197,210
50310 :032,030,171,169,000,141,165
50316 :033,208,141,032,208,165,159
50322 :172,240,036,162,012,189,189
50328 :173,195,024,105,000,133,014
50334 :002,189,174,195,105,212,011
50340 :133,003,173,027,212,201,145
50346 :015,176,249,010,168,169,189
50352 :011,145,002,202,202,202,172
50358 :202,016,222,096,147,017,114
50364 :017,017,029,029,029,018,071
50370 :144,151,176,195,195,195,226
50376 :195,195,195,195,195,195,090
50382 :195,195,195,195,195,195,096
50388 :195,195,195,195,195,195,102
50394 :195,195,195,195,195,195,108
50400 :195,195,195,195,174,013,167
50406 :000,029,029,029,151,018,230
50412 :194,032,032,032,032,032,078
50418 :032,032,032,032,032,032,178
50424 :032,032,032,032,032,032,184
50430 :032,032,032,032,032,032,190
50436 :032,032,032,032,032,032,196
50442 :032,032,194,013,029,029,083
50448 :029,018,144,151,194,032,072
50454 :150,032,151,032,150,032,057
50460 :151,032,150,032,151,032,064
50466 :150,032,151,032,150,032,069
50472 :151,032,150,032,151,032,076
50478 :150,032,151,032,150,032,081
50484 :151,032,150,032,151,032,088
50490 :150,032,151,032,150,032,093
50496 :151,032,150,032,151,032,100
50502 :150,032,151,032,150,032,105
50508 :151,032,150,032,151,032,112
50514 :194,013,000,029,029,029,120
50520 :018,151,194,032,032,032,035
50526 :032,032,032,032,032,032,030
50532 :032,032,032,032,032,032,036
50538 :032,032,032,032,032,032,042
50544 :032,032,032,032,032,032,048
50550 :032,032,032,032,032,032,054
50556 :032,013,000,029,029,029,000
50562 :018,151,194,032,032,032,077
50568 :032,032,032,032,032,032,072
50574 :032,032,032,032,032,032,078
50580 :032,032,032,032,032,032,084
50586 :032,032,032,032,032,032,090
50592 :032,032,032,032,194,013,239
50598 :029,029,029,018,151,173,083
50604 :195,195,195,195,195,195,062
50610 :195,195,195,195,195,195,068
50616 :195,195,195,195,195,195,074
50622 :195,195,195,195,195,195,080
50628 :195,195,195,195,195,195,086
50634 :195,189,000,173,027,212,230
50640 :074,074,074,197,168,176,203
50646 :246,197,169,144,242,157,089
50652 :102,003,157,082,003,096,151
50658 :165,140,208,001,096,162,230
50664 :014,134,002,166,002,189,227
50670 :182,003,208,066,189,157,019
50676 :195,024,105,000,133,170,103
50682 :189,158,195,105,212,133,218
50688 :171,160,002,177,170,041,209
50694 :015,201,011,208,041,198,168
50700 :171,160,254,177,170,041,217
50706 :015,201,011,208,029,230,200
50712 :171,160,000,169,011,145,168
50718 :170,157,182,003,230,006,010
50724 :032,050,193,169,100,024,092
50730 :101,193,133,193,165,194,253
50736 :105,000,133,194,198,002,168
50742 :198,002,016,177,165,251,095
50748 :024,105,000,133,170,165,145
50754 :252,105,212,133,171,160,075
50760 :002,177,170,041,015,201,166
50766 :011,208,040,160,080,177,242
50772 :170,041,015,201,011,208,218
50778 :030,198,171,160,254,177,056
50784 :170,041,015,201,011,208,230
50790 :018,160,176,177,170,041,076
50796 :015,201,011,208,008,238,021
50802 :167,002,169,001,133,248,066
50808 :096,096,162,001,160,014,137
50814 :024,032,240,255,169,254,076
50820 :160,199,032,030,171,162,118
50826 :003,160,000,024,032,240,085
50832 :255,169,170,160,199,032,105
50838 :030,171,162,008,160,038,207
50844 :024,032,240,255,169,219,071
50850 :160,199,032,030,171,162,148
50856 :023,160,005,024,032,240,140
50862 :255,169,139,160,199,032,104
50868 :030,171,096,032,040,199,236
50874 :165,193,133,187,165,194,199
50880 :133,188,169,046,133,002,095
50886 :169,006,133,003,169,000,166
50892 :162,002,149,189,202,016,156
50898 :251,133,192,162,015,006,201
50904 :187,038,188,120,248,165,138
50910 :189,101,189,133,189,165,164
50916 :190,101,190,133,190,165,173
50922 :191,101,191,133,191,216,233
50928 :088,202,016,227,160,000,165
50934 :162,002,181,189,072,074,158
50940 :074,074,074,032,021,199,214
50946 :104,041,015,032,021,199,158
50952 :202,016,237,152,024,105,232
50958 :040,168,169,032,145,002,058
50964 :096,197,192,208,001,096,042
50970 :009,048,133,192,072,152,120
50976 :024,105,040,168,104,145,106
50982 :002,096,165,193,056,229,011
50988 :141,165,194,229,142,144,035
50994 :008,165,193,133,141,165,087
```

```
51000 :194,133,142,165,247,009,178
51006 :048,141,163,007,165,141,215
51012 :133,187,165,142,133,188,248
51018 :169,008,133,002,169,006,049
51024 :133,003,032,202,198,165,045
51030 :248,009,048,141,185,007,212
51036 :198,195,208,016,169,011,121
51042 :133,195,198,196,016,008,076
51048 :032,082,193,104,104,076,183
51054 :158,192,162,047,165,196,006
51060 :056,232,233,010,016,251,146
51066 :142,174,007,024,105,010,072
51072 :009,048,141,175,007,173,169
51078 :141,002,208,251,096,158,222
51084 :076,069,086,069,076,032,036
51090 :032,032,032,032,032,032,082
51096 :084,073,077,069,032,032,007
51102 :032,032,032,032,032,032,094
51108 :077,069,078,032,032,000,196
51114 :072,017,157,073,017,157,151
51120 :071,017,157,072,017,157,155
51126 :032,017,157,083,017,157,133
51132 :067,017,157,079,017,157,170
51138 :082,017,157,069,017,157,181
51144 :032,017,157,032,017,157,100
51150 :032,017,157,032,017,157,106
51156 :032,017,157,032,017,157,112
51162 :000,083,017,157,067,017,047
51168 :157,079,017,157,082,017,221
51174 :157,069,017,157,032,017,167
51180 :157,032,017,157,032,017,136
51186 :157,032,017,157,032,017,142
51192 :157,032,017,157,032,000,131
51198 :158,146,081,085,073,067,096
51204 :075,067,072,065,078,071,176
51210 :069,000,018,005,071,065,238
51216 :077,069,032,079,086,069,172
51222 :082,146,000,013,013,013,033
```

All Commodore 64 programs in this issue work with the Commodore 128 in 64 mode.

Banners

Article on page 58.

BEFORE TYPING . . .

Before typing in programs, please refer to "How To Type In COMPUTE!'s GAZETTE Programs," which appears before the Program Listings.

Program 1: Banners—64 Version

```
100 POKE56,48:POKE55,0:CLR:CU=
    53272:GOSUB520:SYS828:POKE
    53281,15:MT$=""
110 PRINT"{CLR}{BLK}{RVS}
    {13 SPACES}BANNER PRINTER
    {13 SPACES}{OFF}"
120 CC=0:PRINT"{3 DOWN}PRESS A
     KEY:":PRINT"{2 DOWN}{RVS}
    U{OFF}←FOR UPPER CASE AND
    {SPACE}GRAPHICS"
130 PRINT"{2 DOWN}{RVS}L{OFF}←
    FOR UPPER/LOWER CASE"
140 PRINT"{2 DOWN}{RVS}C{OFF}←
    FOR CUSTOM CHARACTER SET (
    CHARACTER{3 SPACES}DATA MU
    ST BE AT 12288!)"
150 GETCH$:IFCH$=""THEN150
160 IFCH$="U"THENCH=16384:PRIN
    TCHR$(142):GOTO200
170 IFCH$="L"THENCH=16384+2048
    :PRINTCHR$(14):GOTO200
180 IFCH$="C"THENFORK=12544TO1
    2551:POKEK,0:NEXT:CH=12288
    :GOSUB510:GOTO200
190 GOTO150
200 PRINT"{CLR}{RVS}WHAT CHARA
    CTER DO YOU WANT TO MAKE U
    P{3 SPACES}THE LARGE LETTE
    RS"
210 GOSUB610:PP$=MT$
220 MT$="":PRINT"{CLR}{RVS}WHA
    T IS YOUR MESSAGE
    {2 SPACES}":GOSUB610:N$=MT
    $
230 PRINT"{RVS}HOW TALL (1 TO
    {SPACE}9)";:INPUTTS:IFTS<1
    THENTS=1
240 PRINT"{RVS}HOW WIDE (1 TO"
    TS"{LEFT})";:INPUTWS:IFWS>
    TSORWS<1THENWS=TS
250 OPEN1,4
260 FORL=1TOLEN(N$)
270 A$=MID$(N$,L,1):PRINT"
    {RVS}{HOME}{9 DOWN}PRINTIN
    G{OFF} "A$:IFA$=" "THENGOS
    UB480:GOTO380
280 Q=ASC(A$):Q=Q+(Q>63)*64+(Q
    >191)*64+(Q=255)*33
290 I=CH+Q*8
300 FORJ=7TO0STEP-1
310 FORK=7TO0STEP-1
320 B=PEEK(I+K)
330 IFBAND2↑JTHENFORT=1TOTS:PR
    $=PR$+PP$:NEXTT:GOTO350
340 FORT=1TOTS:PR$=PR$+" ":NEX
    TT
350 NEXTK
360 FORX=1TOWS:PRINT#1,CHR$(15
    )SPC((72-TS*8)/2)PR$CHR$(8
    ):NEXTX:PR$=""
370 NEXTJ
380 NEXTL
390 PRINT#1,CHR$(8):CLOSE1
400 IF(PEEK(CU)AND12)=12THENPO
    KECU,(PEEK(CU)AND240)OR4:C
    C=1
410 PRINT"{CLR}PRESS A KEY:":P
    RINT"{DOWN}X TO EXIT PROGR
    AM":PRINT"{DOWN}R TO REPRI
    NT MESSAGE"
420 PRINT"{DOWN}N TO ENTER NEW
     MESSAGE"
430 GETY$:IFY$=""THEN430
440 IFY$="R"THENGOSUB490:PRINT
    "{CLR}"N$:GOTO250
450 IFY$="X"THENOPEN1,4:PRINT#
    1,CHR$(15):CLOSE1:PRINT"
    {CLR}":END
460 IFY$="N"THEN110
470 GOTO430
480 FORX=1TO8*WS:PRINT#1,CHR$(
    8):NEXT:RETURN
490 IFCC=1THENCC=0:GOSUB510
500 RETURN
510 POKECU,(PEEK(CU)AND240)OR1
    2:RETURN
520 FORI=828TO887:READA:X=X+A:
    POKEI,A:NEXTI
530 IFX<>8638THENPRINT"ERROR I
    N DATA STATEMENTS.":STOP
540 RETURN
550 DATA 173,14,220,41,254,141
    ,14,220,169,208
560 DATA 133,252,169,64,133,25
    4,165,1,41,251
570 DATA 133,1,169,0,133,251,1
    33,253,168,162
580 DATA 16,177,251,145,253,20
    0,208,249,230
590 DATA 252,230,254,202,208,2
    42,165,1,9,4
600 DATA 133,1,173,14,220,9,1,
    141,14,220,96
610 POKE198,5:POKE631,155:POKE
    632,34:POKE633,34:POKE634,
    20:POKE635,144
620 INPUTMT$:RETURN
```

Program 2: Banners—VIC Version

```
100 POKE56,28:POKE55,0:CLR
                          :rem 11
110 CC=0:PRINT"{CLR}{BLK}{RVS}
    {4 SPACES}BANNER PRINTER
    {4 SPACES}{OFF}":PRINT"
    {2 DOWN}PRESS A KEY:"
                          :rem 79
120 PRINT"{2 DOWN}{RVS}U{OFF}←
    FOR UPPER CASE AND
    {4 SPACES}GRAPHICS":PRINT"
    {2 DOWN}{RVS}L{OFF}←FOR UP
    PER/LOWER CASE"       :rem 84
130 PRINT"{2 DOWN}{RVS}C{OFF}←
    FOR CUSTOM CHARACTER
    {2 SPACES}SET (CHARACTER D
    ATA{3 SPACES}MUST BE IN PL
    ACE1)"                :rem 237
140 GETCH$:IFCH$=""THEN140
                          :rem 225
150 IFCH$="U"THENCH=32768:PRIN
    TCHR$(142):GOTO190:rem 104
160 IFCH$="L"THENCH=32768+2048
    :PRINTCHR$(14):GOTO190
                          :rem 39
170 IFCH$="C"THENFORK=7424TO74
    31:POKEK,0:NEXT:POKE36869,
    255:CH=7168:GOTO190:rem 42
180 GOTO140               :rem 103
190 PRINT"{CLR}{RVS}WHAT CHARA
    CTER DO YOU WANT TO MAKE U
    P THE{3 SPACES}LARGE LETTE
    RS":GOSUB490          :rem 199
200 PP$=MT$:PRINT"{CLR}{RVS}WH
    AT IS YOUR MESSAGE
    {2 SPACES}":GOSUB490:N$=MT
    $                     :rem 49
210 PRINT"{RVS}HOW TALL (1 TO
    {SPACE}9)";:INPUTTS:IFTS<1
    THENTS=1              :rem 188
220 PRINT"{RVS}HOW WIDE (1 TO"
    TS"{LEFT})";:INPUTWS:IFWS>
    TSORWS<1THENWS=1      :rem 65
230 OPEN1,4               :rem 88
240 FORL=1TOLEN(N$)       :rem 124
250 A$=MID$(N$,L,1):PRINT"
    {RVS}{HOME}{10 DOWN}PRINTI
    NG{OFF} "A$:IFA$=" "THENGO
    SUB460:GOTO360        :rem 15
260 Q=ASC(A$):Q=Q+(Q>63)*64+(Q
    >191)*64+(Q=255)*33:rem 68
270 I=CH+Q*8              :rem 136
280 FORJ=7TO0STEP-1       :rem 172
290 FORK=7TO0STEP-1       :rem 174
300 B=PEEK(I+K)           :rem 71
310 IFBAND2↑JTHENFORT=1TOTS:PR
    $=PR$+PP$:NEXTT:GOTO330
                          :rem 252
320 FORT=1TOTS:PR$=PR$+" ":NEX
    TT                    :rem 199
330 NEXTK                 :rem 32
340 FORX=1TOWS:PRINT#1,CHR$(15
    )SPC((72-TS*8)/2)PR$CHR$(8
    ):NEXTX:PR$=""        :rem 186
350 NEXTJ                 :rem 33
360 NEXTL                 :rem 36
370 PRINT#1,CHR$(8):CLOSE1
                          :rem 18
380 POKE36879,26:IFPEEK(36869)
    =255THENCC=1:POKE36869,240
                          :rem 245
390 PRINT"{CLR}PRESS A KEY:":P
    RINT"{2 DOWN}X TO EXIT PRO
    GRAM":PRINT"{2 DOWN}R TO R
    EPRINT MESSAGE"       :rem 182
```

```
400 PRINT"{2 DOWN}N TO ENTER N
    EW MESSAGE"          :rem 229
410 GETY$:IFY$=""THEN410
                         :rem 125
420 IFY$="X"THENOPEN1,4:PRINT#
    1,CHR$(15):CLOSE1:POKE3687
    9,27:PRINT"{CLR}":END
                         :rem 11
430 IFY$="R"THENGOSUB470:PRINT
    "{CLR}"N$:GOTO230 :rem 216
440 IFY$="N"THEN110      :rem 52
450 GOTO410              :rem 103
460 FORX=1TO8*WS:PRINT#1,CHR$(
    8):NEXT:RETURN       :rem 90
470 IFCC=1THENPOKE36869,255:CC
    =0                   :rem 129
480 RETURN               :rem 124
490 POKE198,5:POKE631,5:POKE63
    2,34:POKE633,34:POKE634,20
    :POKE635,144         :rem 194
500 MT$="":INPUTMT$:RETURN
                         :rem 132
```

Program 3: Banners: Plus/4 and 16 Version

```
100 POKE56,52:POKE55,0:CLR:CU=
    65298:GOSUB520:SYS819:COLO
    R0,2,5
110 PRINT"{CLR}{BLK}{RVS}
    {13 SPACES}BANNER PRINTER
    {13 SPACES}{OFF}"
120 CC=0:PRINT"{3 DOWN}PRESS A
     KEY:":PRINT"{2 DOWN}{RVS}
    U{OFF}←FOR UPPER CASE AND
    {SPACE}GRAPHICS"
130 PRINT"{2 DOWN}{RVS}L{OFF}←
    FOR UPPER/LOWER CASE"
140 PRINT"{2 DOWN}{RVS}C{OFF}←
    FOR CUSTOM CHARACTER SET (
    CHARACTER{3 SPACES}DATA MU
    ST BE AT 13312)"
150 GETCH$:IFCH$=""THEN150
160 IFCH$="U"THENCH=14336:PRIN
    TCHR$(142):GOTO200
170 IFCH$="L"THENCH=14336+1024
    :PRINTCHR$(14):GOTO200
180 IFCH$="C"THENFORK=13568TO1
    3575:POKEK,0:NEXT:CH=13312
    :GOSUB510:GOTO200
190 GOTO150
200 PRINT"{CLR}{RVS}WHAT CHARA
    CTER DO YOU WANT TO MAKE U
    P{3 SPACES}THE LARGE LETTE
    RS"
210 GOSUB590:PP$=MT$
220 PRINT"{CLR}{RVS}WHAT IS YO
    UR MESSAGE{2 SPACES}":GOSU
    B590:N$=MT$
230 PRINT"{RVS}HOW TALL (1 TO
    {SPACE}9)";:INPUTTS:IFTS<1
    THENTS=1
240 PRINT"{RVS}HOW WIDE (1 TO"
    TS"{LEFT})";:INPUTWS:IFWS>
    TSORWS<1THENWS=TS
250 OPEN1,4
260 FORL=1TOLEN(N$)
270 A$=MID$(N$,L,1):PRINT"
    {RVS}{HOME}{9 DOWN}PRINTIN
    G{OFF} "A$:IFA$=" "THENGOS
    UB480:GOTO380
280 Q=ASC(A$):Q=Q+(Q>63)*64+(Q
    >191)*64+(Q=255)*33
290 I=CH+Q*8
300 FORJ=7TO0STEP-1
310 FORK=7TO0STEP-1
320 B=PEEK(I+K)
330 IFBAND2↑JTHENFORT=1TOTS:PR
    $=PR$+PP$:NEXTT:GOTO350
340 FORT=1TOTS:PR$=PR$+" ":NEX
    TT
350 NEXTK
360 FORX=1TOWS:PRINT#1,CHR$(15
    )SPC((72-TS*8)/2)PR$CHR$(8
    ):NEXTX:PR$=""
370 NEXTJ
380 NEXTL
390 PRINT#1,CHR$(8):CLOSE1
400 IFCH$="C"THENPOKECU,196:PO
    KECU+1,208:CC=1
410 PRINT"{CLR}PRESS A KEY:":P
    RINT"{DOWN}X TO EXIT PROGR
    AM":PRINT"{DOWN}R TO REPRI
    NT MESSAGE"
420 PRINT"{DOWN}N TO ENTER NEW
     MESSAGE"
430 GETY$:IFY$=""THEN430
440 IFY$="R"THENGOSUB490:PRINT
    "{CLR}"N$:GOTO250
450 IFY$="X"THENOPEN1,4:PRINT#
    1,CHR$(15):CLOSE1:PRINT"
    {CLR}":END
460 IFY$="N"THEN110
470 GOTO430
480 FORX=1TO8*WS:PRINT#1,CHR$(
    8):NEXT:RETURN
490 IFCC=1THENCC=0:GOSUB510
500 RETURN
510 POKECU,PEEK(CU)AND251:POKE
    CU+1,PEEK(CU+1)AND3OR52:RE
    TURN
520 FORI=819TO850:READA:POKEI,
    A:X=X+A:NEXT
530 IFX<>5848THENPRINT"ERROR I
    N DATA STATEMENTS.":STOP
540 RETURN
550 DATA 169,56,133,254,169,20
    8,133,252,169,0
560 DATA 133,251,133,253,168,1
    62,8,177,251
570 DATA 145,253,200,208,249,2
    30,252,230,254
580 DATA 202,208,242,96
590 POKE239,5:POKE1319,155:POK
    E1320,34:POKE1321,34:POKE1
    322,20:POKE1323,144
600 INPUTMT$:RETURN
```

All Commodore 64 programs in this issue work with the Commodore 128 in 64 mode.

The Construction Set

See instructions in article on page 60 before typing in.

BEFORE TYPING . . .

Before typing in programs, please refer to "How To Type In COMPUTE!'s GAZETTE Programs," which appears before the Program Listings.

Program 1: Main Program

```
100 POKE53280,1:POKE53281,1
                         :rem 232
110 PRINT"{CLR}{10 DOWN}
    {9 SPACES}{20 @}" :rem 112
120 PRINT"{9 SPACES}{RVS}THE C
    ONSTRUCTION SET":A$="
    {2 SPACES}{RED}{8 @}"
                         :rem 74
130 PRINT"{7 DOWN}{12 SPACES}P
    LEASE WAIT...        :rem 51
140 POKE55,0:POKE56,64:CLR:BA=
    16384:READA:FORI=1TOA:READ
    X$:NEXT:FORI=1TO352
                         :rem 194
150 READX:S=S+X:NEXT:IFS<>3454
    6THENPRINT"ERROR IN DATA S
    TATEMENTS.":STOP  :rem 176
160 RESTORE:DI=8:READNS:REM SE
    T DI=1 FOR TAPE      :rem 4
170 DATA 3,"HOUSE","CREATURE",
    "SHAPES"             :rem 216
180 PRINT"{UP}{14 SPACES}LOADI
    NG...{2 SPACES}":FORN=0TON
    S-1:CHSET=BA+6144+N*2048:R
    EADX$                :rem 175
190 GOSUB1200:NEXT:PRINT"{CLR}
    {RVS}{GRN}":FORN=1TO40:PRI
    NT"{Y}";:NEXT        :rem 126
200 PRINTA$:PRINT"{2 SPACES}
    {RVS}{RED}{3 SPACES}F1
    {3 SPACES}{OFF}{BLU}
    {9 SPACES}FOR DIFFERENT PI
    CTURE";              :rem 186
210 PRINTA$:PRINT"{2 SPACES}
    {RVS}{RED}{3 SPACES}F7
    {3 SPACES}{OFF}{BLU}
    {9 SPACES}FOR INSTRUCTIONS
    "                    :rem 136
220 PRINTA$:PRINT"{2 SPACES}
    {RVS}{RED}+ AND - {OFF}
    {BLU}{9 SPACES}FOR EXTRA P
    IECES"               :rem 191
230 PRINTA$:PRINT"{2 SPACES}
    {RVS}{RED} CURSOR {BLU}
    {OFF}{9 SPACES}SELECTS PIE
    CE"                  :rem 200
240 PRINT"{2 SPACES}{RED}
    {10 @}":PRINT"{2 SPACES}
    {RVS}{RED} JOYSTICK {BLU}
    {OFF}{7 SPACES}POSITIONS P
    IECE"                :rem 115
250 PRINT"{2 SPACES}{RED}
    {13 @}":PRINT"{2 SPACES}
    {RVS}{RED} FIRE BUTTON
    {OFF}{BLU}{4 SPACES}STAMPS
     PIECE"              :rem 2
260 PRINT"{2 SPACES}{RED}
    {10 @}":PRINT"{2 SPACES}
    {RVS}{RED} INST DEL {OFF}
    {BLU}{7 SPACES}ERASES PIEC
    E"                   :rem 19
270 PRINT"{2 SPACES}{RED}
    {16 @}":PRINT"{2 SPACES}
    {RVS}{RED} SHIFT CLR HOME
    {SPACE}{OFF}{BLU} ERASES S
    CREEN"               :rem 187
280 PRINT"{2 SPACES}{RED}
    {38 @}";             :rem 26
290 PRINT"{2 SPACES}{RVS}{RED}
    PUSH ← AND THEN F1, F3, F5
    {12 SPACES}"         :rem 254
300 PRINT"{2 SPACES}{BLU}TO CH
    ANGE BORDER, SCREEN, & PIC
    TURE{5 SPACES}COLOR. F7 RE
    SUMES PROGRAM"       :rem 74
310 PRINT"{RVS}{GRN}":FORN=1TO
    40:PRINT"{Y}";:NEXT
                         :rem 239
320 PRINT"{13}{9 SPACES}USE POR
    T 2 FOR JOYSTICK.";:rem 11
330 V=53248:SB=15360+BA:SC=BA:
    H1=33:CB=1:MM=254:MN=-1
                         :rem 23
340 SE=8:FORSP=0TO2:FORN=0TO63
    :READD:POKESB+N+(64*SP),D:
    NEXT:NEXT            :rem 184
350 FORA=53088TO53247:READI:PO
    KEA,I:NEXT:SYS53088:POKE17
    400,241:POKE17401,240
                         :rem 117
```

```
360 POKE17402,242:POKEV+39,1:P
    OKEV+3,205:POKEV+2,24:POKE
    V+40,10:POKEV+28,1 :rem 87
370 POKEV+37,5:POKEV+38,1:POKE
    V+28,PEEK(V+28)OR4:POKEV+4
    1,1                :rem 41
380 DIMA$(80,3):X=1:FORC=1TO20
                       :rem 201
390 CO=CO+1:FORR=1TO3:A$(C,R)=
    STR$(X):X=X+32:NEXT:X=X-93
    :IFCO=10THENCO=0:X=X+66
                       :rem 153
400 NEXTC:CO=0:FORC=21TO50:CO=
    CO+1:A$(C,1)=STR$(X):A$(C,
    2)="256":A$(C,3)="256"
                       :rem 68
410 X=X+3:IFCO=10THENCO=0:X=X+
    2                  :rem 139
420 NEXT:POKE53265,PEEK(53265)
    AND239:POKE56578,PEEK(5657
    8)OR3              :rem 88
430 POKE56576,(PEEK(56576)AND2
    52)OR2:A=4:SK=-16:POKE5327
    0,PEEK(53270)OR16:PY=1
                       :rem 13
440 FORN=1TONS:GOSUB690:POKE53
    281,15:PRINT"{CLR}":POKE53
    281,0:NEXT:PY=0:A=4:SK=-16
                       :rem 154
450 POKE53282,2:POKE53283,1:GO
    SUB690:POKEV+21,3:POKEV,24
    :POKEV+1,50        :rem 247
460 POKEV+27,0:POKE53265,PEEK(
    53265)OR16:X=24:Y=50
                       :rem 150
470 J2=PEEK(56320):FR=J2AND16:
    JV=15-(J2AND15):IFJV=1THEN
    Y=Y-SE:IFY<50THENY=50
                       :rem 230
480 IFJV=2THENY=Y+SE:IFY>194TH
    ENY=194            :rem 124
490 IFJV=4THENX=X-SE:IFX<24THE
    NX=24              :rem 11
500 IFJV=8THENX=X+SE:IFX>312TH
    ENX=312            :rem 103
510 TR=(X>255):POKEV+16,(PEEK(
    V+16)AND(MM))ORTR*(MN):POK
    EV+SP*2,X+(TR*255):rem 152
520 POKEV+(SP*2)+1,Y+2:IFFR=0T
    HEN640             :rem 108
530 GETKH$:IFKH$=""THEN470
                       :rem 250
540 IFVAL(KH$)<4ANDVAL(KH$)>0T
    HENSE=8*VAL(KH$):GOTO470
                       :rem 14
550 IFKH$="-"THENCB=CB-9:IFCB<
    0THENCB=37         :rem 127
560 IFKH$="+"THENCB=CB+9:IFCB>
    37THENCB=1         :rem 127
570 IFKH$="+"ORKH$="-"THENGOSU
    B730:GOTO530       :rem 232
580 IFKH$="{RIGHT}"ORKH$="
    {LEFT}"THEN GOSUB780:GOTO4
    70                 :rem 83
590 IFASC(KH$)=20THEN640
                       :rem 116
600 IFKH$="{CLR}"THENPOKE53281
    ,15:PRINT"{CLR}":POKE53281
    ,0:GOSUB730:GOTO470
                       :rem 171
610 IFKH$="{F1}"THENGOSUB690
                       :rem 49
620 IFKH$="{F7}"THENGOSUB1260
                       :rem 95
630 GOTO470            :rem 109
640 X1=(X-24)/8:Y1=((Y-50)/8)*
    40:S=SC+X1+Y1:FORR=1TO3:FO
    RC=0TO2            :rem 172
650 P=VAL(A$(CB+CX,R))+C:IFKH$
    <>""THEN:IFASC(KH$)=20THEN
    P=32               :rem 30
660 IFP>255THENP=32    :rem 118
670 POKES+C+(R-1)*40,P:NEXT:IF
    VAL(A$(CB+CX,1))+C>185THEN
    R=3                :rem 210
680 NEXT:FR=1:GOTO470  :rem 43
690 A=A+2:SK=SK+16:IFA>12OR(A-
    6)/2=NSTHENA=6:SK=0
                       :rem 168
700 SC=BA+1024*SK/16:POKE53272
    ,(PEEK(53272)AND15)ORSK
                       :rem 23
710 POKE53272,(PEEK(53272)AND2
    40)ORA:POKE648,SC/256:IFPY
    =1THENRETURN       :rem 147
720 POKESC+1016,241:POKESC+101
    7,240:POKESC+1018,242:GOSU
    B730:RETURN        :rem 239
730 VA=0:CO=0:FORC=1TO9:CO=CO+
    1:FORR=1TO3:FORN=1TO3:P=VA
    L(A$(CB+C-1,R))-1+N:rem 61
740 IFP>255THENP=32    :rem 117
750 POKESC+880+VA+N+(C-1)*4+(R
    -1)*40,P:NEXT:IFVAL(A$(CB+
    C-1,R))-1+N>185THENN=3
                       :rem 179
760 NEXT:IFCO=9THENCO=0:VA=VA+
    120                :rem 62
770 NEXT:GOSUB800:RETURN
                       :rem 73
780 IFKH$="{LEFT}"THEN H1=H1-3
    2:CX=CX-1:IFCX<0THENCX=8:H
    1=288              :rem 159
790 IFKH$="{RIGHT}"THEN H1=H1+
    32:CX=CX+1:IFCX>8THENCX=0:
    H1=40              :rem 224
800 IFVAL(A$(CB+CX,1))+C>185TH
    ENSP=2:SV=-16:POKEV+21,6:M
    M=251:MN=-4        :rem 195
810 IFVAL(A$(CB+CX,1))+C<189TH
    ENSP=0:SV=0:POKEV+21,3:MM=
    254:MN=-1          :rem 93
820 TZ=(H1>255):POKEV+16,(PEEK
    (V+16)AND(253))ORTZ*(-2):P
    OKEV+2,H1+(TZ*255):rem 237
830 RETURN             :rem 123
840 DATA 3,252,0,7,254,0,15,25
    4,0,31             :rem 213
850 DATA 110,0,31,247,0,29,255
    ,0,55,253          :rem 113
860 DATA 128,61,191,128,59,223
    ,128,50,238,128    :rem 185
870 DATA 115,187,128,99,187,12
    8,3,185,0,3,144,0  :rem 25
880 DATA2,128,0,3,128,0,3,128,
    0,2                :rem 113
890 DATA128,0,1,0,0,0,0,0,0,0
                       :rem 147
900 DATA0,0,85,85,85,127,255,2
    53,112,0           :rem 122
910 DATA13,112,0,13,112,0,13,1
    12,0,13            :rem 28
920 DATA112,0,13,112,0,13,112,
    0,13,112           :rem 77
930 DATA0,13,112,0,13,112,0,13
                       :rem 206
940 DATA112,0,13,112,0,13,112,
    0,13,112           :rem 79
950 DATA0,13,112,0,13,112,0,13
    ,112,0             :rem 236
960 DATA13,127,255,253,85,85,8
    5,247,85,85        :rem 55
970 DATA85,106,170,169,96,0,9,
    96,0,9             :rem 50
980 DATA 96,0,9,96,0,9,96,0,9,
    106                :rem 102
990 DATA170,169,85,85,85,0,0,0
    ,0,0               :rem 183
1000 DATA0,0,0,0,0,0,0,0,0,0
                       :rem 71
1010 DATA 0,0,0,0,0,0,0,0,0,0,0
                       :rem 72
1020 DATA0,0,0,0,0,0,0,0,0,0,0
                       :rem 73
1030 DATA 0,0,120,173,40,3,141
    ,248,207,173       :rem 247
1040 DATA41,3,141,249,207,173,
    250,207,141,40     :rem 150
1050 DATA3,173,251,207,141,41,
    3,88,96,165        :rem 20
1060 DATA145,201,253,208,116,1
    20,169,0,133,198   :rem 2
1070 DATA32,159,255,32,228,255
    ,201,0,240,246     :rem 160
1080 DATA201,133,240,15,201,13
    4,240,23,201,135   :rem 231
1090 DATA240,31,201,136,240,84
    ,76,130,207,173    :rem 206
1100 DATA32,208,24,105,1,141,3
    2,208,76,130       :rem 42
1110 DATA 207,173,33,208,24,10
    5,1,141,33,208     :rem 96
1120 DATA 76,130,207,165,243,1
    41,252,207,165,244:rem 55
1130 DATA 141,253,207,169,0,13
    3,243,169,216,133  :rem 4
1140 DATA 244,173,134,2,24,105
    ,1,141,134,2       :rem 248
1150 DATA 162,4,160,0,145,243,
    136,208,251,202    :rem 148
1160 DATA 240,5,230,244,76,216
    ,207,173,252,207   :rem 212
1170 DATA 133,243,173,253,207,
    133,244,76,130,207:rem 56
1180 DATA 88,108,248,207,237,2
    46,123,207,2,0     :rem 121
1190 DATA 255,255      :rem 73
1200 FORI=1TOLEN(X$):POKE678+I
    ,ASC(MID$(X$,I)):NEXT
                       :rem 63
1210 POKE781,167:POKE782,2:POK
    E780,LEN(X$):SYS65469
                       :rem 236
1220 POKE780,1:POKE781,DI:POKE
    782,0:SYS65466     :rem 92
1230 POKE780,0:POKE781,0:POKE7
    82,CHSET/256:SYS65493
                       :rem 18
1240 IF(PEEK(783)AND1)OR(191AN
    DST)THENPRINT"LOAD ERROR"
    :STOP              :rem 244
1250 CLOSE1:RETURN     :rem 137
1260 POKE56578,PEEK(56578)OR3:
    POKE 56576,(PEEK(56576)AN
    D252)OR3           :rem 66
1270 POKE53270,PEEK(53270)AND2
    39:POKE53272,(PEEK(53272)
    AND15)OR16         :rem 177
1280 POKE53272,(PEEK(53272)AND
    240)OR4:XX=PEEK(V+21):POK
    EV+21,0:POKE53281,0
                       :rem 35
1290 GETK$:IFK$=""THEN1290
                       :rem 207
1300 POKE56578,PEEK(56578)OR3:
    POKE56576,(PEEK(56576)AND
    252)OR2            :rem 60
1310 POKE53270,PEEK(53270)OR16
    :POKE53272,(PEEK(53272)AN
    D15)ORSK           :rem 122
1320 POKE53272,(PEEK(53272)AND
    240)ORA:POKE53281,0:POKEV
    +21,XX:RETURN      :rem 68
```

Program 2: The Construction Set—House Character Set

```
28672 :000,000,000,000,000,000,000,000
28678 :000,000,000,000,000,000,003,009
28684 :003,000,000,000,060,060,135
28690 :060,255,255,060,060,060,000
28696 :000,000,000,192,192,000,152
28702 :000,000,081,085,081,069,090
28708 :081,069,084,069,020,085,188
28714 :069,020,085,021,081,021,083
28720 :081,069,081,069,017,085,194
28726 :069,017,017,069,106,096,172
```

```
28732 :096,096,106,096,069,005,016
28738 :170,040,040,040,170,040,054
28744 :017,069,169,009,009,009,098
28750 :169,009,017,084,085,069,255
28756 :085,021,090,091,016,085,216
28762 :021,085,105,190,235,170,128
28768 :081,084,021,085,017,085,213
28774 :165,229,021,020,085,081,191
28780 :085,021,085,084,004,085,216
28786 :021,085,085,081,085,069,028
28792 :065,085,020,085,085,020,224
28798 :085,021,017,084,085,021,183
28804 :090,024,088,088,081,081,072
28810 :085,085,170,040,040,040,086
28816 :069,068,085,081,165,037,137
28822 :037,036,000,000,000,000,223
28828 :000,000,000,000,000,000,156
28834 :000,000,000,000,000,000,162
28840 :000,000,000,000,003,015,186
28846 :051,255,040,020,020,020,068
28852 :255,255,255,063,000,000,240
28858 :000,000,255,063,255,255,246
28864 :000,000,000,000,255,063,254
28870 :255,243,000,000,000,000,184
28876 :240,060,255,255,000,000,246
28882 :000,000,000,000,000,192,146
28888 :000,000,000,000,000,000,216
28894 :000,000,084,069,085,022,226
28900 :090,091,088,027,085,097,194
28906 :169,138,206,207,000,207,137
28912 :069,085,084,085,145,149,089
28918 :149,133,000,000,000,000,016
28924 :000,000,000,000,000,000,252
28930 :000,000,000,000,000,000,002
28936 :000,000,000,000,000,001,009
28942 :006,027,060,060,060,060,031
28948 :085,170,051,207,000,000,021
28954 :000,000,000,064,144,228,206
28960 :085,081,085,069,081,084,005
28966 :069,081,068,081,021,084,186
28972 :021,084,069,084,085,081,212
28978 :069,085,017,085,069,085,204
28984 :096,096,106,085,085,106,118
28990 :096,096,040,040,170,085,077
28996 :085,170,040,040,009,009,165
29002 :169,085,085,169,009,009,088
29008 :091,091,091,091,088,091,111
29014 :091,091,255,255,247,247,248
29020 :055,055,255,255,229,037,210
29026 :229,229,229,229,229,229,192
29032 :021,084,085,021,090,024,173
29038 :088,088,085,081,085,085,110
29044 :170,040,040,040,085,068,047
29050 :085,081,165,037,037,036,051
29056 :024,088,088,024,090,085,015
29062 :021,085,040,040,040,040,144
29068 :170,085,021,085,037,037,063
29074 :037,037,164,085,020,085,062
29080 :000,000,000,000,003,015,170
29086 :170,086,003,015,060,255,235
29092 :051,255,170,149,252,207,224
29098 :252,255,051,255,170,085,214
29104 :252,255,240,255,255,063,216
29110 ;170,069,252,255,243,255,146
29116 :207,255,170,084,252,255,131
29122 :243,255,207,255,170,084,128
29128 :252,255,243,255,207,255,131
29134 :170,084,240,252,243,255,170
29140 :207,255,170,084,000,000,160
29146 :000,192,048,252,170,105,217
29152 :091,091,089,073,089,089,234
29158 :026,089,207,207,101,101,193
29164 :101,101,170,101,149,145,235
29170 :149,149,148,149,133,149,095
29176 :000,000,000,000,000,000,248
29182 :000,000,000,000,000,000,254
29188 :000,000,000,001,091,091,187
29194 :091,091,088,091,090,085,034
29200 :195,195,000,000,000,243,137
29206 :170,085,229,229,229,229,169
29212 :037,229,165,085,085,081,198
29218 :069,084,069,080,085,085,250
29224 :005,081,069,084,069,085,177
29230 :069,085,081,085,017,085,212
29236 :069,081,081,085,096,096,048
29242 :096,096,096,096,106,085,121
29248 :040,040,040,040,040,040,048
29254 :170,085,009,009,009,009,105
29260 :009,009,169,085,091,091,018
29266 :091,091,089,090,106,170,207
29272 :255,255,255,255,170,170,168
29278 :170,170,229,037,229,229,134
29284 :101,165,169,170,024,088,049
29290 :088,024,090,085,021,085,243
29296 :040,040,040,040,170,085,015
29302 :021,085,037,037,037,037,116
29308 :164,085,020,085,080,085,131
29314 :021,085,085,081,085,069,044
29320 :084,085,021,085,085,081,065
29326 :085,069,085,085,021,085,060
29332 :085,081,085,069,086,085,127
29338 :085,085,084,085,085,085,151
29344 :148,149,149,148,149,149,028
29350 :145,149,085,081,085,085,028
29356 :085,069,084,085,085,081,149
29362 :085,085,085,069,084,085,159
29368 :085,081,085,085,085,069,162
29374 :084,085,085,081,085,085,183
29380 :085,069,084,085,085,081,173
29386 :085,085,085,069,084,085,183
29392 :085,081,085,085,085,069,186
29398 :084,085,105,101,101,101,023
29404 :101,101,101,101,089,089,034
29410 :089,089,090,106,085,085,002
29416 :101,101,101,101,170,170,208
29422 :085,085,149,149,149,149,236
29428 :149,165,085,085,000,000,216
29434 :000,000,000,000,000,000,250
29440 :000,000,000,000,000,000,000
29446 :000,000,000,000,000,000,006
29452 :000,000,000,000,000,000,012
29458 :000,000,000,000,000,000,018
29464 :002,001,009,005,038,027,106
29470 :155,086,128,064,096,080,127
29476 :152,228,230,149,000,000,027
29482 :000,000,000,000,000,000,042
29488 :000,000,000,000,000,000,048
29494 :000,000,000,000,000,000,054
29500 :000,000,000,000,002,003,065
29506 :011,015,047,063,190,249,129
29512 :170,255,255,255,255,255,237
29518 :191,111,170,255,255,255,035
29524 :255,255,255,255,170,255,249
29530 :255,255,255,255,250,229,053
29536 :170,255,255,255,255,255,005
29542 :255,191,170,255,255,255,203
29548 :255,255,254,249,128,192,161
29554 :224,240,248,252,190,111,099
29560 :000,000,000,000,000,000,120
29566 :000,000,149,149,149,149,210
29572 :149,149,149,149,085,080,125
29578 :080,080,085,085,085,085,126
29584 :086,086,086,086,086,086,148
29590 :086,086,000,000,000,000,066
29596 :000,000,000,000,000,000,156
29602 :000,000,000,000,000,000,162
29608 :130,105,085,085,085,085,231
29614 :085,085,000,000,000,000,088
29620 :000,000,000,000,168,047,139
29626 :047,047,032,032,032,032,152
29632 :000,000,192,240,252,015,123
29638 :003,000,021,086,090,106,248
29644 :091,091,091,091,170,170,140
29650 :170,170,255,255,195,195,170
29656 :086,149,165,169,229,229,219
29662 :229,165,168,084,084,084,012
29668 :084,084,084,084,002,001,055
29674 :001,001,001,001,001,001,240
29680 :168,084,084,084,084,084,060
29686 :084,084,000,000,000,000,158
29692 :000,000,000,000,000,000,252
29698 :000,000,000,000,000,000,002
29704 :000,000,000,000,000,000,008
29710 :000,000,002,001,009,001,027
29716 :037,021,149,086,085,085,227
29722 :086,086,091,111,191,213,036
29728 :085,085,149,149,229,249,210
29734 :254,087,128,064,096,080,235
29740 :088,084,086,149,000,000,195
29746 :000,000,000,000,000,000,050
29752 :002,003,011,015,047,063,197
29758 :191,170,249,249,249,250,140
29764 :234,255,255,170,111,111,180
29770 :111,175,171,255,255,170,187
29776 :255,255,255,255,255,255,074
29782 :255,170,229,229,229,234,152
29788 :170,255,255,170,191,191,044
29794 :191,191,175,255,255,170,055
29800 :249,249,249,250,234,255,054
29806 :255,170,111,111,111,175,019
29812 :171,255,255,170,128,192,007
29818 :224,240,248,252,254,170,230
29824 :149,149,149,149,149,149,254
29830 :149,149,005,005,005,085,020
29836 :085,085,085,080,086,086,135
29842 :086,086,086,086,086,086,150
29848 :000,000,000,000,000,000,152
29854 :000,000,000,000,000,000,158
29860 :000,000,000,000,069,069,046
29866 :069,085,085,085,085,081,148
29872 :000,000,002,001,001,001,181
29878 :001,001,032,032,034,169,195
29884 :169,101,085,085,000,000,116
29890 :000,000,000,000,000,000,194
29896 :091,091,091,091,091,088,231
29902 :091,091,195,195,195,255,204
29908 :255,063,063,255,229,229,026
29914 :229,229,229,229,229,229,056
29920 :084,086,085,085,084,084,220
29926 :084,084,001,169,085,085,226
29932 :085,085,085,085,084,084,232
29938 :084,084,084,084,084,020,170
29944 :000,000,000,000,000,000,248
29950 :000,000,000,000,000,000,254
29956 :000,000,000,000,002,001,007
29962 :009,006,043,175,175,170,076
29968 :091,109,189,253,253,255,142
29974 :255,170,106,104,104,096,089
29980 :096,085,255,170,169,041,076
29986 :041,009,009,085,255,170,091
29992 :229,121,126,127,127,255,001
29998 :255,170,128,064,096,144,135
30004 :232,248,254,170,085,085,102
30010 :086,089,101,149,085,170,226
30016 :101,153,086,085,085,085,147
30022 :085,170,085,085,085,149,217
30028 :101,089,086,170,085,085,180
30034 :086,089,101,149,085,170,250
30040 :101,153,086,085,085,085,171
30046 :085,170,085,085,085,149,241
30052 :101,089,086,170,085,085,204
30058 :086,089,101,149,085,170,018
30064 :101,153,086,085,085,085,195
30070 :085,170,085,085,085,149,009
30076 :101,089,086,170,149,149,100
30082 :149,149,149,149,149,149,000
30088 :080,080,080,085,085,085,119
30094 :085,085,086,086,086,086,144
30100 :086,086,086,086,160,080,220
30106 :080,085,085,085,085,085,147
30112 :160,080,080,085,085,085,223
30118 :085,085,081,081,081,085,152
30124 :085,085,085,085,001,001,002
30130 :001,001,001,001,001,001,184
30136 :085,085,085,085,085,085,182
30142 :085,085,000,000,000,000,104
30148 :000,000,000,000,091,091,122
30154 :091,091,090,090,105,165,066
30160 :255,255,255,255,150,085,183
30166 :105,170,229,165,229,229,061
30172 :165,165,105,090,068,069,114
30178 :069,069,069,069,085,085,160
30184 :085,085,085,085,085,085,230
30190 :085,085,020,020,020,020,232
30196 :084,084,084,084,000,000,068
30202 :000,000,000,000,000,000,250
30208 :000,000,000,000,000,000,000
30214 :000,000,136,136,170,136,072
30220 :136,170,136,136,136,136,094
30226 :170,136,136,170,136,136,134
30232 :136,136,170,136,136,170,140
30238 :136,136,188,191,143,191,247
30244 :191,143,191,143,000,195,131
30250 :235,235,235,000,235,235,193
30256 :062,254,242,254,254,242,076
30262 :254,254,170,191,191,191,025
30268 :130,128,128,170,170,235,253
30274 :235,232,040,040,040,170,055
30280 :170,254,254,034,002,002,020
30286 :002,170,085,085,086,089,083
30292 :101,149,149,170,105,150,140
30298 :085,125,255,125,085,170,167
30304 :085,085,149,101,089,086,179
30310 :086,170,170,149,149,149,207
30316 :180,156,144,170,170,085,245
30322 :065,000,000,000,000,170,093
30328 :170,086,086,086,030,054,120
30334 :006,170,002,001,001,169,219
30340 :085,085,085,085,160,080,200
30346 :080,090,085,085,085,085,136
30352 :042,021,021,149,085,085,035
30358 :085,085,085,021,085,084,083
30364 :085,021,085,085,085,021,026
```

```
30370 :085,084,085,021,085,085,095
30376 :085,021,085,084,085,021,037
30382 :085,085,170,170,168,170,254
30388 :042,168,170,170,170,170,046
30394 :168,170,042,168,170,170,050
30400 :170,042,168,170,170,170,058
30406 :138,170,252,255,255,255,243
30412 :063,255,255,243,255,255,250
30418 :255,255,063,255,255,243,000
30424 :255,243,255,255,063,255,006
30430 :255,243,085,086,091,111,069
30436 :111,191,191,191,169,254,055
30442 :255,255,255,255,255,255,228
30448 :084,084,148,228,228,248,236
30454 :248,248,000,000,000,000,230
30460 :000,000,000,000,000,000,252
30466 :000,000,000,000,000,000,002
30472 :000,000,003,015,063,255,088
30478 :170,085,060,255,255,255,070
30484 :255,255,170,085,000,000,017
30490 :192,240,252,255,170,085,196
30496 :160,160,170,165,165,166,250
30502 :168,160,000,000,170,105,129
30508 :130,000,000,000,010,010,194
30514 :170,090,090,154,042,010,094
30520 :160,160,160,160,160,160,248
30526 :160,160,000,000,000,000,126
30532 :000,000,000,000,010,010,088
30538 :010,010,010,010,010,010,134
30544 :000,000,000,000,000,000,080
30550 :000,000,085,085,085,085,170
30556 :085,085,085,085,064,064,048
30562 :064,064,064,064,064,064,226
30568 :170,128,128,128,128,128,146
30574 :128,170,170,000,000,000,066
30580 :000,000,000,170,170,002,202
30586 :002,002,002,002,002,170,046
30592 :000,000,000,000,010,170,052
30598 :165,085,000,000,010,170,052
30604 :165,085,081,085,010,170,224
30610 :165,081,085,069,085,085,204
30616 :160,170,090,085,021,081,247
30622 :085,085,000,000,160,170,146
30628 :090,085,021,085,000,000,189
30634 :000,000,160,170,090,021,099
30640 :000,000,000,002,001,011,190
30646 :039,189,040,190,125,215,212
30652 :255,125,215,255,000,000,014
30658 :000,128,064,224,216,126,184
30664 :002,000,000,000,000,000,202
30670 :000,000,160,191,189,189,167
30676 :131,128,128,128,000,000,215
30682 :240,240,240,000,000,000,170
30688 :191,191,191,111,111,091,086
30694 :086,085,255,255,255,255,141
30700 :255,255,254,169,248,248,129
30706 :248,228,228,148,084,084,238
30712 :000,000,000,000,000,000,248
30718 :000,013,013,013,013,013,063
```

Program 3: The Construction Set—Creature Character Set

```
28672 :000,000,000,000,000,000,000
28678 :000,000,000,000,000,003,009
28684 :003,015,005,010,000,048,093
28690 :252,255,255,255,085,170,010
28696 :000,000,000,000,000,192,216
28702 :064,128,000,000,000,001,223
28708 :005,063,085,010,020,085,048
28714 :085,105,085,255,085,170,059
28720 :000,000,000,064,080,252,188
28726 :085,160,000,003,015,015,076
28732 :063,062,042,234,255,255,203
28738 :255,255,255,255,190,170,166
28744 :000,192,240,240,252,188,160
28750 :168,171,012,035,000,000,208
28756 :001,005,021,021,000,000,132
28762 :215,105,085,085,085,085,238
28768 :048,200,000,000,064,080,232
28774 :084,084,053,213,080,074,178
28780 :200,192,240,255,255,125,095
28786 :085,060,060,060,234,234,079
28792 :092,087,005,163,035,003,249
28798 :015,255,170,128,128,131,185
28804 :143,143,143,143,170,000,106
28810 :000,255,255,255,255,255,133
28816 :170,002,002,194,242,242,228
28822 :242,242,000,000,000,002,124
28828 :002,009,009,009,042,170,141
28834 :170,170,170,008,008,089,009
28840 :000,128,128,160,160,024,000
28846 :024,088,000,003,013,013,059
28852 :013,010,010,063,213,085,062
28858 :085,085,085,170,170,255,012
28864 :085,201,122,122,112,160,226
28870 :160,252,000,003,015,063,179
28876 :063,048,048,048,255,255,153
28882 :255,255,063,063,012,012,102
28888 :240,252,255,255,207,003,148
28894 :003,003,000,000,001,005,234
28900 :021,085,085,020,021,085,033
28906 :085,085,085,085,085,020,167
28912 :000,064,080,084,084,085,125
28918 :085,020,000,000,000,000,095
28924 :000,000,000,000,000,000,252
28930 :000,000,000,000,000,000,002
28936 :011,010,032,040,042,034,177
28942 :008,010,239,254,100,100,213
28948 :154,154,152,254,192,128,030
28954 :032,160,160,032,128,128,154
28960 :037,170,160,161,042,042,132
28966 :010,010,235,125,040,105,051
28972 :170,190,130,170,088,170,194
28978 :010,074,168,168,168,168,038
28984 :233,249,250,251,254,255,012
28990 :062,058,170,170,190,255,199
28996 :255,150,170,169,107,111,006
29002 :175,239,191,255,188,172,014
29008 :021,087,086,085,021,023,147
29014 :005,001,085,215,150,125,155
29020 :255,000,255,125,084,213,000
29026 :149,085,084,208,080,064,000
29032 :255,254,254,255,061,061,220
29038 :053,023,170,170,157,085,000
29044 :085,105,106,170,191,175,180
29050 :175,127,092,092,084,180,104
29056 :143,143,143,143,131,128,191
29062 :136,170,255,255,255,255,180
29068 :255,130,000,170,242,242,155
29074 :242,242,194,002,034,170,006
29080 :002,002,000,000,000,000,156
29086 :000,000,153,162,162,170,037
29092 :128,042,042,008,161,161,194
29098 :128,128,128,000,000,000,042
29104 :063,042,255,191,173,175,051
29110 :171,169,191,175,174,110,148
29116 :125,255,215,170,188,172,033
29122 :191,126,122,250,250,106,215
29128 :048,060,015,015,015,015,112
29134 :015,015,012,015,015,063,085
29140 :240,252,207,003,003,015,164
29146 :012,204,252,252,252,060,226
29152 :020,005,005,005,005,001,009
29158 :001,001,215,004,085,081,105
29164 :081,150,255,085,020,080,139
29170 :080,080,080,064,064,064,162
29176 :000,000,000,000,000,000,248
29182 :000,000,000,000,000,000,254
29188 :000,000,000,000,015,050,069
29194 :002,003,003,013,063,063,157
29200 :223,086,170,171,239,253,134
29206 :087,255,192,240,000,000,028
29212 :000,192,252,252,002,002,216
29218 :003,003,013,053,021,021,148
29224 :042,128,170,234,255,076,177
29230 :085,117,032,160,176,240,088
29236 :208,092,084,085,014,003,026
29242 :000,003,063,063,255,255,185
29248 :150,170,255,255,255,255,124
29254 :255,255,176,192,000,192,116
29260 :252,252,255,255,002,005,073
29266 :023,085,087,095,127,127,114
29272 :085,150,105,215,215,125,215
29278 :255,255,128,080,212,085,085
29284 :213,245,253,253,000,000,040
29290 :003,015,063,243,251,235,148
29296 :060,255,255,255,255,255,167
29302 :255,255,000,000,192,240,036
29308 :252,207,239,235,000,000,033
29314 :000,000,000,000,003,015,148
29320 :040,040,040,040,040,235,059
29326 :239,255,000,000,000,000,124
29332 :000,000,192,240,000,008,076
29338 :034,032,034,032,032,032,094
29344 :170,000,008,128,042,128,124
29350 :042,128,128,040,034,130,156
29356 :034,130,032,130,171,042,199
29362 :042,042,010,010,022,022,070
29368 :085,215,255,190,170,170,245
29374 :170,170,232,168,168,168,242
29380 :160,160,144,148,003,000,043
29386 :000,000,000,002,009,009,222
29392 :192,252,127,031,149,086,021
29398 :088,088,012,048,240,064,242
29404 :128,000,000,000,034,034,160
29410 :033,034,034,034,034,034,173
29416 :085,150,170,170,105,105,249
29422 :085,105,136,136,072,136,140
29428 :136,136,136,136,000,000,020
29434 :000,000,000,000,000,000,250
29440 :000,000,000,000,000,000,000
29446 :000,000,243,243,060,060,100
29452 :015,013,015,002,223,255,023
29458 :223,255,125,223,255,171,246
29464 :255,207,060,060,240,112,190
29470 :240,192,085,081,085,021,222
29476 :023,014,006,001,085,093,002
29482 :085,117,085,093,085,085,080
29488 :085,085,069,069,084,124,052
29494 :160,064,255,243,243,240,235
29500 :252,060,062,014,255,255,190
29506 :255,255,255,255,255,255,060
29512 :255,255,207,207,207,060,239
29518 :188,176,127,095,023,005,180
29524 :002,000,000,003,255,255,087
29530 :255,255,191,063,127,213,170
29536 :253,245,212,208,160,000,150
29542 :064,240,176,160,040,010,024
29548 :130,160,164,166,255,255,214
29554 :255,190,170,040,000,130,131
29560 :014,010,040,160,130,010,228
29566 :026,154,060,060,015,003,188
29572 :000,000,000,000,170,170,216
29578 :170,235,175,190,186,170,240
29584 :060,060,240,192,000,000,184
29590 :000,000,000,008,008,008,174
29596 :000,000,010,010,008,162,090
29602 :008,162,008,162,136,000,126
29608 :002,130,000,130,000,128,046
29614 :168,040,085,085,085,081,206
29620 :081,081,081,081,170,105,011
29626 :085,085,105,085,105,085,224
29632 :085,085,085,085,069,069,158
29638 :069,069,037,009,009,002,137
29644 :002,000,000,000,088,088,126
29650 :088,090,086,149,149,037,041
29656 :000,000,000,000,128,128,216
29662 :128,096,033,034,034,034,069
29668 :034,034,034,087,105,105,115
29674 :105,170,150,170,170,170,145
29680 :072,136,136,136,136,136,224
29686 :136,196,000,000,000,000,066
29692 :000,000,000,000,000,000,252
29698 :000,000,000,000,000,000,002
29704 :015,015,015,015,015,015,098
29710 :015,015,254,255,207,207,199
29716 :207,207,003,003,160,248,080
29722 :248,242,192,192,192,192,004
29728 :001,000,005,021,053,213,069
29734 :213,213,085,040,085,085,247
29740 :085,085,085,065,000,000,108
29746 :080,084,092,087,087,087,055
29752 :014,002,003,015,015,063,168
29758 :063,063,191,255,255,255,120
29764 :255,255,195,003,160,192,104
29770 :240,240,240,252,252,252,014
29776 :015,063,015,015,003,000,191
29782 :000,000,255,255,255,255,082
29788 :255,255,255,063,252,255,147
29794 :252,252,240,192,192,000,202
29800 :166,166,038,006,130,160,002
29806 :164,166,166,166,166,166,080
29812 :166,036,000,130,154,154,244
29818 :152,144,130,010,026,154,226
29824 :000,010,009,009,010,009,175
29830 :009,009,170,170,085,085,150
29836 :170,085,085,085,000,160,213
29842 :096,096,160,096,096,096,018
29848 :002,000,002,008,008,008,180
29854 :008,008,000,162,008,000,088
29860 :000,000,000,000,032,128,068
29866 :032,008,008,008,008,008,242
29872 :165,245,053,005,000,005,137
29878 :005,005,105,085,105,065,040
29884 :000,085,085,081,090,095,112
29890 :092,080,000,080,080,080,094
29896 :000,000,000,000,001,004,205
29902 :017,065,009,002,000,000,043
29908 :020,084,105,128,096,088,221
29914 :150,150,150,152,152,088,036
29920 :023,019,007,003,003,003,026
```

```
29926 :003,003,255,255,195,195,112
29932 :195,195,195,195,213,212,161
29938 :196,192,192,192,192,192,118
29944 :000,000,000,000,000,000,248
29950 :000,000,000,000,000,000,254
29956 :000,000,000,000,015,060,079
29962 :060,060,060,060,060,000,054
29968 :003,003,003,003,000,000,028
29974 :000,000,192,192,192,192,022
29980 :240,240,240,000,005,005,246
29986 :001,001,005,005,005,005,056
29992 :065,065,065,065,000,000,044
29998 :000,000,095,127,127,127,010
30004 :083,080,080,080,252,240,099
30010 :240,240,060,060,060,063,013
30016 :000,000,000,000,000,000,064
30022 :003,003,255,063,015,063,216
30028 :252,240,240,192,000,000,232
30034 :000,000,003,015,015,002,117
30040 :063,063,255,255,255,243,198
30046 :243,128,000,000,192,192,081
30052 :240,252,252,160,166,166,056
30058 :038,006,128,160,010,000,192
30064 :166,166,166,166,166,000,174
30070 :002,168,154,154,152,128,108
30076 :002,040,128,000,010,009,057
30082 :009,010,000,002,002,000,153
30088 :170,085,085,170,128,034,040
30094 :034,128,160,096,096,160,048
30100 :128,032,032,128,008,000,220
30106 :002,002,002,002,002,000,164
30112 :000,000,000,000,000,000,160
30118 :000,128,008,000,032,032,110
30124 :032,032,032,128,001,001,142
30130 :001,001,001,001,001,004,187
30136 :064,064,064,064,064,064,056
30142 :001,001,080,080,080,080,000
30148 :080,080,064,000,020,085,013
30154 :088,100,097,024,022,005,026
30160 :086,129,006,018,073,165,173
30166 :022,104,088,088,080,096,180
30172 :096,128,000,000,003,003,194
30178 :003,003,001,001,001,005,240
30184 :195,195,195,195,065,065,118
30190 :065,085,192,192,192,192,132
30196 :064,064,064,080,000,000,004
30202 :000,000,000,000,000,000,250
30208 :000,000,000,000,000,000,000
30214 :000,000,000,000,000,000,006
30220 :002,002,002,042,000,000,060
30226 :000,170,170,170,150,170,080
30232 :000,000,000,000,128,128,024
30238 :128,168,000,000,000,000,070
30244 :000,000,255,255,063,255,096
30250 :255,255,251,234,255,255,011
30256 :000,192,192,192,192,192,240
30262 :255,255,000,000,000,003,055
30268 :013,013,010,010,013,053,172
30274 :087,087,085,085,170,170,238
30280 :192,240,010,010,192,112,060
30286 :160,160,000,000,000,001,143
30292 :001,007,085,085,020,085,111
30298 :085,085,084,085,255,085,001
30304 :000,000,000,064,064,208,176
30310 :085,085,004,005,005,005,035
30316 :005,005,005,005,065,065,002
30322 :065,065,065,065,065,065,248
30328 :016,080,080,080,080,080,024
30334 :080,080,015,003,003,003,054
30340 :003,003,003,003,192,000,080
30346 :000,000,000,000,000,000,138
30352 :252,048,048,048,048,048,124
30358 :048,048,160,240,240,224,086
30364 :240,251,255,207,000,000,085
30370 :000,000,000,000,195,195,040
30376 :010,015,015,011,015,239,217
30382 :255,243,255,255,255,255,156
30388 :255,255,255,255,255,255,174
30394 :247,255,255,247,255,255,164
30400 :255,255,255,255,255,255,186
30406 :255,255,085,085,085,085,024
30412 :085,085,085,085,089,085,206
30418 :085,089,085,089,085,085,216
30424 :085,085,085,085,085,085,214
30430 :085,085,170,128,170,128,220
30436 :170,128,170,170,170,000,012
30442 :170,000,170,000,170,170,146
30448 :170,002,170,002,170,002,244
30454 :170,170,000,000,000,000,074
30460 :000,000,000,000,000,000,252
30466 :000,000,000,000,000,000,002
30472 :000,002,002,002,002,002,018
30478 :002,010,000,170,153,153,246
30484 :153,153,153,170,000,128,009
30490 :128,128,128,128,128,160,058
30496 :130,040,010,034,130,000,120
30502 :000,002,032,008,002,032,114
30508 :128,130,136,160,032,128,246
30514 :136,034,168,000,000,000,132
30520 :000,000,000,000,000,000,056
30526 :000,002,170,170,170,170,232
30532 :170,170,170,170,000,000,236
30538 :000,000,000,000,000,128,202
30544 :010,011,011,011,011,010,144
30550 :011,042,170,174,238,250,203
30556 :254,254,174,170,000,000,176
30562 :000,000,000,000,000,128,226
30568 :012,015,015,015,014,015,190
30574 :252,252,195,195,195,227,146
30580 :138,195,195,195,048,240,103
30586 :240,176,240,240,063,063,120
30592 :000,003,003,003,003,015,155
30598 :051,195,000,000,000,000,124
30604 :000,192,051,051,000,048,226
30610 :048,048,048,240,060,051,129
30616 :000,000,000,000,003,004,159
30622 :012,008,015,063,061,255,060
30628 :204,068,204,136,000,192,200
30634 :192,240,204,068,204,136,190
30640 :012,063,062,002,000,000,059
30646 :000,000,000,000,000,000,182
30652 :128,032,034,008,015,063,212
30658 :059,008,032,128,000,000,165
30664 :021,005,005,005,005,005,246
30670 :005,004,065,065,065,065,219
30676 :065,065,065,065,080,080,120
30682 :080,080,080,080,080,016,122
30688 :000,000,000,000,003,013,240
30694 :001,000,192,192,000,192,039
30700 :240,220,208,192,012,012,096
30706 :000,012,063,221,029,012,067
30712 :000,000,000,000,000,192,184
30718 :000,013,013,013,013,013,063
```

Program 4: The Construction Set—Shapes Character Set

```
28672 :000,000,000,000,000,000,000
28678 :000,000,170,170,160,160,154
28684 :160,160,160,160,170,170,224
28690 :000,000,000,000,000,000,018
28696 :170,170,010,010,010,010,148
28702 :010,010,170,170,170,170,218
28708 :170,170,170,170,170,170,032
28714 :170,170,170,170,170,170,038
28720 :170,170,170,170,170,170,044
28726 :170,170,085,085,085,085,222
28732 :085,085,085,085,085,085,058
28738 :085,085,085,085,085,085,064
28744 :085,085,085,085,085,085,070
28750 :085,085,255,255,255,255,244
28756 :255,255,255,255,255,255,078
28762 :255,255,255,255,255,255,084
28768 :255,255,255,255,255,255,090
28774 :255,255,255,255,240,240,066
28780 :240,240,240,240,255,255,042
28786 :060,060,060,060,060,060,218
28792 :255,255,015,015,015,015,178
28798 :015,015,000,000,000,000,156
28804 :000,000,000,000,012,012,156
28810 :012,063,063,063,255,255,081
28816 :000,000,000,000,000,000,144
28822 :192,192,000,000,000,000,022
28828 :000,000,000,002,032,032,222
28834 :032,032,032,032,168,086,032
28840 :000,000,000,000,000,000,168
28846 :000,000,032,038,038,038,064
28852 :038,038,038,038,000,000,076
28858 :064,102,102,102,102,102,248
28864 :002,038,102,102,102,102,128
28870 :102,102,000,000,000,000,146
28876 :000,000,000,000,004,004,212
28882 :004,012,012,012,012,012,018
28888 :000,000,000,000,000,000,216
28894 :000,000,000,000,000,000,222
28900 :000,000,000,000,020,020,012
28906 :020,020,020,020,020,020,098
28912 :000,000,000,000,000,000,240
28918 :000,000,000,000,000,000,246
28924 :000,000,000,000,000,000,252
28930 :000,000,000,000,000,000,002
28936 :160,160,160,160,160,160,200
28942 :160,160,000,000,000,000,078
28948 :000,000,000,000,010,010,040
28954 :010,010,010,010,010,010,086
28960 :170,170,170,170,170,170,028
28966 :170,170,170,170,170,170,034
28972 :170,170,170,170,170,170,040
28978 :170,170,170,170,170,170,046
28984 :085,085,085,085,085,085,054
28990 :085,085,085,085,085,085,060
28996 :085,085,085,085,085,085,066
29002 :085,085,085,085,085,085,072
29008 :255,255,255,255,255,255,074
29014 :255,255,255,255,255,255,080
29020 :255,255,255,255,255,255,086
29026 :255,255,255,255,255,255,092
29032 :240,240,240,255,240,240,023
29038 :240,240,060,060,060,255,001
29044 :060,060,060,060,015,015,130
29050 :015,255,015,015,015,015,196
29056 :000,003,003,003,015,003,155
29062 :003,003,255,255,255,255,136
29068 :255,255,255,255,192,240,056
29074 :240,240,252,240,240,240,062
29080 :009,037,150,090,105,105,136
29086 :105,090,101,169,154,086,095
29092 :085,101,085,086,128,096,233
29098 :088,148,164,165,164,148,023
29104 :038,038,038,038,038,038,148
29110 :038,038,102,102,102,102,154
29116 :102,102,102,102,102,102,032
29122 :102,102,102,102,102,102,038
29128 :010,009,009,009,255,009,245
29134 :009,009,174,093,093,127,199
29140 :247,127,093,093,168,088,004
29146 :088,088,255,088,088,088,145
29152 :000,000,000,000,085,085,138
29158 :000,000,020,020,020,020,054
29164 :085,085,020,020,000,000,190
29170 :000,000,085,085,000,000,156
29176 :000,000,000,000,000,000,248
29182 :000,000,000,000,000,000,254
29188 :000,000,000,000,160,160,068
29194 :160,160,160,160,170,170,222
29200 :000,000,000,000,000,000,016
29206 :170,170,010,010,010,010,146
29212 :010,010,170,170,170,170,216
29218 :170,170,170,170,170,170,030
29224 :170,170,170,170,170,170,036
29230 :170,170,170,170,170,170,042
29236 :170,170,170,170,085,085,134
29242 :085,085,085,085,085,085,056
29248 :085,085,085,085,085,085,062
29254 :085,085,085,085,085,085,068
29260 :085,085,085,085,255,255,158
29266 :255,255,255,255,255,255,076
29272 :255,255,255,255,255,255,082
29278 :255,255,255,255,255,255,088
29284 :255,255,255,255,240,240,064
29290 :240,240,240,240,255,255,040
29296 :060,060,060,060,060,060,216
29302 :255,255,015,015,015,015,176
29308 :015,015,255,255,000,000,152
29314 :000,000,000,000,000,000,130
29320 :255,255,255,063,063,063,066
29326 :012,012,192,192,192,000,230
29332 :000,000,000,000,150,037,079
29338 :009,002,000,000,000,000,165
29344 :154,169,101,086,168,032,102
29350 :032,032,088,096,128,000,030
29356 :000,000,000,000,038,038,248
29362 :038,038,038,038,038,038,150
29368 :102,102,102,102,102,102,028
29374 :102,102,102,102,102,102,034
29380 :102,102,102,102,010,000,102
29386 :000,000,000,000,000,000,202
29392 :174,012,012,012,012,012,186
29398 :004,004,168,000,000,000,134
29404 :000,000,000,000,000,000,220
29410 :000,000,000,000,000,000,226
29416 :020,020,020,020,020,020,096
29422 :020,020,000,000,000,000,022
29428 :000,000,000,000,000,000,244
29434 :000,000,000,000,000,000,250
29440 :000,000,000,000,000,000,000
29446 :000,000,085,085,000,000,176
29452 :085,085,000,000,085,085,096
29458 :000,000,085,085,000,000,188
29464 :085,085,000,000,085,085,108
29470 :000,000,255,255,000,000,028
29476 :255,255,000,000,255,255,032
29482 :000,000,255,255,000,000,040
```

```
29488 :255,255,000,000,255,255,044
29494 :000,000,170,170,000,000,138
29500 :170,170,000,000,170,170,228
29506 :000,000,170,170,000,000,150
29512 :170,170,000,000,170,170,240
29518 :000,000,128,000,032,000,238
29524 :008,000,002,000,000,000,094
29530 :000,000,000,000,000,000,090
29536 :002,000,008,000,032,000,138
29542 :128,000,000,000,010,170,154
29548 :042,002,000,000,010,170,076
29554 :168,000,160,170,042,000,142
29560 :170,128,000,000,000,000,162
29566 :160,170,170,255,255,170,026
29572 :255,255,170,252,170,255,209
29578 :255,170,255,255,170,204,167
29584 :170,255,255,170,255,255,224
29590 :170,255,000,000,000,000,063
29596 :000,000,000,000,000,000,156
29602 :000,000,000,000,000,000,162
29608 :000,001,001,005,005,021,201
29614 :021,085,000,064,064,080,232
29620 :080,084,084,085,000,000,001
29626 :000,000,000,000,000,000,186
29632 :000,000,000,000,000,000,192
29638 :000,000,000,000,000,000,198
29644 :002,002,010,010,036,036,044
29650 :165,165,165,165,165,165,176
29656 :000,000,000,000,064,064,088
29662 :080,080,170,191,063,047,085
29668 :015,011,003,002,170,255,172
29674 :255,255,255,255,255,255,228
29680 :170,254,252,248,240,224,092
29686 :192,128,000,000,000,000,054
29692 :000,000,000,000,000,000,252
29698 :000,000,000,000,000,000,002
29704 :085,085,000,000,085,085,092
29710 :000,000,085,085,000,000,184
29716 :085,085,000,000,085,085,104
29722 :000,000,085,085,000,000,196
29728 :255,255,000,000,255,255,028
29734 :000,000,255,255,000,000,036
29740 :255,255,000,000,255,255,040
29746 :000,000,255,255,000,000,048
29752 :170,170,000,000,170,170,224
29758 :000,000,170,170,000,000,146
29764 :170,170,000,000,170,170,236
29770 :000,000,170,170,000,000,158
29776 :000,000,000,000,000,000,080
29782 :000,000,130,000,040,000,000
29788 :040,000,130,000,000,000,006
29794 :000,000,000,000,000,000,098
29800 :000,000,010,170,042,002,072
29806 :000,000,010,170,168,000,202
29812 :160,170,042,002,168,128,018
29818 :000,000,000,000,160,170,196
29824 :252,168,252,252,168,252,192
29830 :252,168,204,136,204,204,022
29836 :136,204,204,136,255,170,221
29842 :255,255,170,255,255,170,226
29848 :000,000,000,000,000,000,152
29854 :000,000,000,001,001,005,165
29860 :005,021,021,085,085,085,210
29866 :085,085,085,085,085,085,168
29872 :085,085,085,085,085,085,174
29878 :085,085,000,064,064,080,048
29884 :080,084,084,085,000,000,009
29890 :000,000,000,000,000,000,194
29896 :042,042,170,170,170,085,111
29902 :085,021,165,165,165,165,204
29908 :165,090,090,090,084,084,047
29914 :085,085,085,170,170,168,213
29920 :000,000,000,000,000,000,224
29926 :000,000,255,190,060,060,027
29932 :060,060,060,190,000,000,094
29938 :000,000,000,000,000,000,242
29944 :000,000,000,000,000,000,248
29950 :000,000,000,000,000,000,254
29956 :000,000,000,000,085,085,174
29962 :000,000,085,085,000,000,180
29968 :085,085,000,000,085,085,100
29974 :000,000,085,085,000,000,192
29980 :085,085,000,000,255,255,196
29986 :000,000,255,255,000,000,032
29992 :255,255,000,000,255,255,036
29998 :000,000,255,255,000,000,044
30004 :255,255,000,000,170,170,134
30010 :000,000,170,170,000,000,142
30016 :170,170,000,000,170,170,232
30022 :000,000,170,170,000,000,154
30028 :170,170,000,000,002,000,162
30034 :008,000,032,000,128,000,250
30040 :000,000,000,000,000,000,088
30046 :000,000,128,000,032,000,254
30052 :008,000,002,000,000,000,110
30058 :010,170,042,002,000,000,074
30064 :010,170,168,128,160,170,150
30070 :042,002,168,128,000,000,202
30076 :000,000,160,170,252,252,190
30082 :170,255,255,170,255,170,125
30088 :204,204,170,255,255,170,114
30094 :255,170,255,255,170,255,222
30100 :255,170,255,170,000,001,231
30106 :001,005,005,021,021,085,036
30112 :085,085,085,085,085,085,158
30118 :085,085,085,085,085,085,164
30124 :085,085,085,085,085,085,170
30130 :085,085,085,085,085,085,176
30136 :085,085,085,085,085,085,182
30142 :085,085,000,064,064,080,056
30148 :080,084,084,085,021,005,043
30154 :005,001,001,000,000,000,209
30160 :090,090,090,090,090,090,236
30166 :090,024,168,160,160,128,176
30172 :128,000,000,000,000,002,094
30178 :003,011,015,047,063,170,023
30184 :255,255,255,255,255,255,226
30190 :255,170,000,128,192,224,183
30196 :240,248,252,170,000,000,130
30202 :000,000,000,000,000,000,250
30208 :000,000,000,000,000,000,000
30214 :000,000,255,002,002,002,011
30220 :002,002,002,002,255,085,104
30226 :085,085,085,085,085,085,016
30232 :255,128,128,128,128,128,151
30238 :128,128,000,000,003,015,048
30244 :015,063,063,255,060,255,235
30250 :255,255,255,215,215,085,042
30256 :000,000,192,240,240,252,204
30262 :252,255,192,192,192,234,091
30268 :213,213,213,213,000,000,144
30274 :000,170,085,085,085,085,064
30280 :003,003,003,171,087,087,170
30286 :087,087,160,160,170,160,134
30292 :160,170,160,160,000,000,222
30298 :170,000,000,170,000,000,174
30304 :010,010,170,010,010,170,220
30310 :010,010,000,000,000,000,122
30316 :002,008,032,128,000,000,022
30322 :040,170,000,000,000,000,068
30328 :000,000,000,000,128,032,024
30334 :008,002,240,092,092,092,140
30340 :087,087,087,085,000,000,222
30346 :000,000,000,000,000,195,077
30352 :015,053,053,053,213,213,232
30358 :213,085,085,064,064,064,213
30364 :064,064,064,085,085,000,006
30370 :000,000,000,000,000,085,247
30376 :085,001,001,001,001,001,002
30382 :001,085,128,128,170,128,046
30388 :170,128,170,128,000,000,008
30394 :170,000,170,000,170,000,184
30400 :002,002,170,002,170,002,028
30406 :170,002,238,187,238,187,196
30412 :238,187,238,187,238,187,199
30418 :238,187,238,187,238,187,205
30424 :238,187,238,187,238,187,211
30430 :238,187,004,085,004,004,232
30436 :085,004,004,085,016,085,251
30442 :016,016,085,016,016,085,212
30448 :065,085,065,065,085,065,158
30454 :065,085,000,000,000,000,140
30460 :000,000,000,000,000,000,252
30466 :000,000,000,000,000,000,002
30472 :002,002,002,002,002,002,020
30478 :002,255,085,085,085,085,099
30484 :085,085,085,255,128,128,018
30490 :128,128,128,128,128,255,153
30496 :253,255,063,063,015,003,172
30502 :000,000,085,085,215,215,126
30508 :255,255,255,060,127,255,227
30514 :252,252,240,192,000,000,218
30520 :213,213,213,213,234,192,054
30526 :192,192,085,085,085,085,018
30532 :170,000,000,000,087,087,156
30538 :087,087,171,003,003,003,172
30544 :170,160,160,170,160,160,036
30550 :170,160,170,000,000,170,244
30556 :000,000,170,000,170,010,186
30562 :010,170,010,010,170,010,222
30568 :128,128,032,008,002,000,146
30574 :000,000,000,000,000,000,110
30580 :000,170,040,000,002,002,074
30586 :008,032,128,000,000,000,034
30592 :085,085,087,087,087,092,139
30598 :092,252,125,195,000,000,030
30604 :000,000,000,000,085,085,054
30610 :213,213,213,053,053,063,186
30616 :255,192,192,192,192,192,087
30622 :192,255,255,000,000,000,092
30628 :000,000,000,255,255,003,165
30634 :003,003,003,003,003,255,184
30640 :170,128,128,128,128,128,218
30646 :128,170,170,000,000,000,138
30652 :000,000,000,170,170,002,018
30658 :002,002,002,002,002,170,118
30664 :102,153,102,153,102,153,197
30670 :102,153,102,153,102,153,203
30676 :102,153,102,153,102,153,209
30682 :102,153,102,153,102,153,215
30688 :012,012,255,012,012,255,014
30694 :012,012,048,048,255,048,141
30700 :048,255,048,048,195,195,001
30706 :255,195,195,255,195,195,252
30712 :000,000,000,000,000,000,248
30718 :000,013,013,013,013,013,063
```

All Commodore 64 programs in this issue work with the Commodore 128 in 64 mode.

SpeedCheck

See instructions in article on page 64 before typing in.

BEFORE TYPING . . .

Before typing in programs, please refer to "How To Type In COMPUTE!'s GAZETTE Programs," which appears before the Program Listings.

Program 1: Dictionary Manager

```
100 POKE55,0:POKE56,25:CLR:SA=
    PEEK(56)*256          :rem 187
110 LN=5:D$="{5 DOWN}":S$="
    {8 SPACES}"           :rem 72
120 PRINT CHR$(142)"{CLR}"D$TA
    B(8)"{RVS} DICTIONARY MANA
    GER "                 :rem 239
130 PRINT "{2 DOWN} PRESS: [1]
     TO REVIEW ENTRIES{DOWN}":
    PRINT S$"[2] TO ADD ENTRIE
    S{DOWN}"              :rem 218
140 PRINT S$"[3] TO EDIT ENTRI
    ES{DOWN}":PRINT S$"[4] TO
    {SPACE}PRINT ENTRIES{DOWN}
    "                     :rem 133
150 PRINT S$"[5] TO PREPARE A
    {SPACE}NEW DISK{DOWN}":PRI
    NT S$"[6] TO EXIT THE MANA
    GER{3 DOWN}"          :rem 64
160 GET K$:IF K$<"1" OR K$>"6"
     THEN160              :rem 93
170 PRINT"{CLR}{4 DOWN}":ON VA
    L(K$) GOSUB370,450,670,550
    ,190,180:GOTO120      :rem 185
180 PRINT"{CLR}":END      :rem 14
190 PRINT S$"{RVS} CREATE NEW
    {SPACE}DICTIONARY DISK ":P
    RINT"{2 DOWN}ARE YOU SURE"
    ;                     :rem 47
200 INPUT" [Y/N]";K$:IF LEFT$(
    K$,1)<>"Y" THEN PRINT"
    {CLR}":RETURN         :rem 151
```

```
210 INPUT"{2 DOWN}UNIQUE ID FO
    R THIS DISK";ID$:PRINT"
    {2 DOWN}FORMATTING....PLEA
    SE WAIT"              :rem 242
220 OPEN 15,8,15,"N0:DICTIONAR
    Y DISK,"+ID$:GOSUB910:IF E
    R THEN RETURN         :rem 54
230 PRINT"{DOWN}FORMATTING COM
    PLETE...CREATING HEADINGS:
    "                     :rem 31
240 FOR I=65 TO 90:OPEN 1,8,8,
    "0:"+CHR$(I)+",S,W":GOSUB9
    10:IF ER THEN270      :rem 108
250 CLOSE 1:PRINT CHR$(I);:NEX
    T:PRINT               :rem 27
260 PRINT"{DOWN}** DICTIONARY
    {SPACE}DISK CREATED **
    {2 DOWN}":GOTO880 :rem 112
270 PRINT"CREATING FILE FOR ";
    CHR$(I):PRINT"{DOWN}TRY AG
    AIN";:GOTO200         :rem 79
280 PRINT S$"{DOWN}(ENTER
    {RVS}@{OFF} FOR MENU)
    {DOWN}"               :rem 211
290 INPUT"{DOWN}STARTING WITH"
    ;L$:L=ASC(L$+CHR$(0)):IF L
    =64 OR L=42 THEN RETURN
                          :rem 54
300 L$=CHR$(L):IF L<65 OR L>90
     THEN PRINT S$L$" IS NOT A
    VALID LETTER":GOTO290
                          :rem 49
310 OPEN15,8,15:OPEN1,8,8,"0:"
    +L$+K$:GOSUB910:IF ER=0 TH
    EN RETURN             :rem 198
320 PRINT"{DOWN}TRYING TO ACCE
    SS FILE FOR ";L$:GOTO290
                          :rem 105
330 F=0:GET#1,K$:K=ASC(K$+CHR$
    (0)):IF K>127 THEN K=K AND
     127:F=1              :rem 161
340 IF K<>39 THEN K=K OR 64
                          :rem 100
350 W$=W$+CHR$(K):IF ST OR F T
    HEN RETURN            :rem 249
360 GOTO330               :rem 104
370 PRINT S$"{RVS} REVIEW ENTR
    IES ":K$=",S,R":GOSUB280:I
    F L=64 OR L=42 THEN RETURN
                          :rem 182
380 GET#1,K$:W$=L$:GOSUB330:IF
     MID$(W$,2,1)<>"@" THEN400
                          :rem 43
390 PRINT"{DOWN}** NO ENTRIES
    {SPACE}FOR ";L$;" **":GOTO
    880                   :rem 1
400 PRINT CHR$(14)"{CLR}
    {2 DOWN}ENTRIES FOR "L$:PR
    INT"{DOWN}(HOLD DOWN {RVS}
     SPACE {OFF} TO ADVANCE)
    {DOWN}"               :rem 196
410 PRINT S$;W$:IF ST THEN430
                          :rem 133
420 WAIT 203,64,64:W$=L$:GOSUB
    330:GOTO410           :rem 70
430 IF ST<>64 THEN910 :rem 122
440 WAIT 203,64:POKE 198,0:GOT
    O880                  :rem 114
450 PRINT S$"{RVS} ADD ENTRIES
    ":K$=",A":GOSUB280:IF L=6
    4 OR L=42 THEN RETURN
                          :rem 28
460 PRINT CHR$(14)"{CLR}{DOWN}
    ENTER WORDS STARTING WITH
    {SPACE}{RVS}";L$   :rem 184
465 PRINT"{DOWN}(TYPE {RVS}@
    {OFF} TO QUIT){DOWN}"
                          :rem 111
470 W$="":INPUT W$:F$=LEFT$(W$
    ,1):IF F$="@"THEN CLOSE1:C
    LOSE15:PRINT"{CLR}":RETURN
                          :rem 205
480 IF F$<>L$ AND F$<>CHR$(L+1
    28)THENPRINTW$" DOESN'T ST
    ART WITH "L$"{DOWN}":GOTO4
    70                    :rem 166
490 N=LEN(W$):IF N<LN THEN PRI
    NT W$" HAS FEWER THAN"LN"L
    ETTERS{DOWN}":GOTO470
                          :rem 219
500 FOR I=2 TO N:K=ASC(MID$(W$
    ,I)):IF K=39 THEN520
                          :rem 209
510 IF K<65 OR(K>90 AND K<193)
    OR K>218 THEN K=0 :rem 158
520 K=K AND 63:IF I=N THEN K=K
     OR 128               :rem 129
530 IF K THEN PRINT#1,CHR$(K);
    :IF ST THEN910        :rem 191
540 NEXT:PRINT S$W$" ADDED.":G
    OTO470                :rem 99
550 PRINT S$"{RVS}{2 SPACES}PR
    INT ENTRIES{2 SPACES}":PRI
    NT"{DOWN}{2 SPACES}(ENTER
    {SPACE}{RVS}*{OFF} TO PRIN
    T ALL ENTRIES)"   :rem 119
560 K$=",S,R":GOSUB280:IF L=64
     THEN RETURN          :rem 167
570 OPEN 4,4,7:IF L=42 THEN FO
    R I=65 TO 90:L$=CHR$(I):K$
    =",S,R":GOSUB310  :rem 135
580 GET#1,K$:W$=L$:GOSUB330:K=
    ST:IF MID$(W$,2,1)<>"@" TH
    EN600                 :rem 152
590 PRINT#4,"** NO ENTRIES FOR
     "L$" **":GOTO650 :rem 250
600 PRINT#4,"ENTRIES BEGINNING
     WITH "L$":":PRINT#4
                          :rem 93
610 FOR J=0 TO 3:PRINT#4,W$SPC
    (20-LEN(W$));:IF K THEN J=
    4:GOTO630             :rem 134
620 W$=L$:GOSUB330:K=ST
                          :rem 121
630 NEXT J:PRINT#4:IF K=0 THEN
    610                   :rem 135
640 IF K<>64 THEN CLOSE 4:GOTO
    910                   :rem 62
650 CLOSE 1:CLOSE 15:PRINT#4:P
    RINT#4:IF L=42 THEN NEXT I
                          :rem 3
660 CLOSE 4:RETURN        :rem 96
670 PRINT S$"{RVS} EDIT ENTRIE
    S ":K$=",S,R":GOSUB280:IF
    {SPACE}L=64 OR L=42 THEN R
    ETURN                 :rem 13
680 PRINT CHR$(14)"{CLR}
    {2 DOWN}EDIT WORDS STARTIN
    G WITH "L$":"         :rem 166
690 PRINT"{DOWN}(ENTER {RVS}@
    {OFF} TO CANCEL EDITING)
    {2 DOWN}":GET#1,K$:AD=SA
                          :rem 188
700 W$=L$:GOSUB330:IF MID$(W$,
    2,1)="@" THEN PRINT"** NO
    {SPACE}ENTRIES **":GOTO880
                          :rem 16
710 PRINT"{2 SPACES}"W$:K$="":
    INPUT"{UP}";K$:N=LEN(K$):I
    F N=0 THEN800         :rem 6
720 F$=LEFT$(K$,1):IF F$="@" T
    HEN PRINT"{DOWN}EDITING CA
    NCELED":GOTO880       :rem 119
730 IF F$<>L$ AND F$<>CHR$(L+1
    28)THEN PRINT K$" DOESN'T
    {SPACE}START WITH "L$:GOTO
    710                   :rem 64
740 IF N<LN THEN PRINT K$"HAS
    {SPACE}FEWER THAN"LN"LETTE
    RS":GOTO710           :rem 73
750 FOR I=2 TO N:K=ASC(MID$(K$
    ,I)):IF K=39 THEN780
                          :rem 212
760 IF(K>64 AND K<91)OR(K>192
    {SPACE}AND K<219) THEN780
                          :rem 15
770 PRINT K$" HAS INVALID CHAR
    ACTER":AD=AD-I-2:GOTO710
                          :rem 175
780 K=K AND 63:IF I=N THEN K=K
     OR 128               :rem 137
790 POKE AD,K:AD=AD+1:NEXT:IF
    {SPACE}AD>40959 THEN AD=AD
    -N:PRINT"{RVS}BUFFER FULL"
    :GOTO820              :rem 192
800 IF ST=0 THEN700       :rem 1
810 IF ST<>64 THEN910 :rem 124
820 PRINT"{2 DOWN}** WRITING N
    EW FILE FOR "L$" **"
                          :rem 126
830 CLOSE 1:PRINT#15,"S0:"+L$:
    GOSUB910:IF ER<2 THEN860
                          :rem 73
840 INPUT"TRY AGAIN [Y/N]";K$:
    IF LEFT$(K$,1)<>"Y" THEN R
    ETURN                 :rem 98
850 OPEN 15,8,15:GOTO820
                          :rem 56
860 OPEN 1,8,8,"0:"+L$+",S,W":
    PRINT#1:IF ST THEN GOSUB91
    0:GOTO840             :rem 146
870 FOR I=SA TO AD-1:PRINT#1,C
    HR$(PEEK(I));:NEXT:IF ST T
    HEN GOSUB910:GOTO840
                          :rem 250
880 CLOSE 1:CLOSE 15:PRINT"
    {DOWN}{RVS} PRESS ANY KEY
    {SPACE}FOR MENU "     :rem 5
890 GET K$:IF K$="" THEN890
                          :rem 121
900 PRINT"{CLR}":RETURN:rem 23
910 INPUT#15,ER,E$:IF ER>1 THE
    N PRINT"{DOWN}{RVS} DISK E
    RROR:";ER;E$:CLOSE 15:CLOS
    E 1                   :rem 89
920 RETURN                :rem 123
```

Program 2: SpeedCheck

```
49152 :029,008,010,000,153,034,234
49158 :147,014,008,034,058,158,169
49164 :050,048,056,050,058,083,101
49170 :080,069,069,068,067,072,187
49176 :069,067,075,000,000,000,235
49182 :015,012,001,169,005,009,241
49188 :176,141,020,018,173,031,083
49194 :008,141,033,208,141,032,093
49200 :208,165,001,041,254,133,082
49206 :001,169,000,133,254,032,131
49212 :144,255,169,203,205,110,122
49218 :035,141,110,035,208,027,110
49224 :133,254,173,008,032,133,037
49230 :176,173,009,032,133,177,010
49236 :024,173,023,032,105,001,186
49242 :133,174,173,024,032,105,219
49248 :000,133,175,032,117,011,052
49254 :162,000,160,000,032,154,098
49260 :011,032,032,011,173,032,143
49266 :008,166,254,240,003,173,190
49272 :033,008,141,040,216,032,078
49278 :162,008,165,254,240,009,196
49284 :224,013,208,005,032,189,035
49290 :016,208,011,224,136,208,173
49296 :236,032,067,016,165,248,140
49302 :240,203,032,162,008,032,059
49308 :200,008,076,153,008,164,253
49314 :166,177,168,072,177,168,066
49320 :073,128,145,168,169,226,053
49326 :133,255,032,228,255,164,217
49332 :166,170,208,009,202,208,119
49338 :253,198,255,208,241,240,045
49344 :229,104,145,168,096,162,072
49350 :013,032,102,009,032,144,018
49356 :009,138,176,057,201,013,030
49362 :208,003,076,236,012,201,178
49368 :017,208,003,076,219,009,236
49374 :201,029,208,003,076,180,151
49380 :009,201,094,208,003,076,051
49386 :232,010,201,133,208,025,019
49392 :032,180,009,176,111,032,012
```

```
49398 :228,255,201,013,240,104,007
49404 :164,166,177,170,041,015,217
49410 :205,033,008,208,233,240,161
49416 :188,201,019,208,016,165,037
49422 :167,201,001,208,007,165,251
49428 :166,208,003,076,254,010,225
49434 :076,032,011,201,136,208,178
49440 :003,076,067,016,201,137,020
49446 :208,025,032,036,010,164,001
49452 :166,177,170,041,015,205,050
49458 :033,008,240,143,165,167,038
49464 :201,002,176,236,192,000,095
49470 :208,232,096,201,140,208,123
49476 :003,076,239,015,201,145,235
49482 :208,003,076,006,010,201,066
49488 :147,208,003,076,070,011,083
49494 :201,157,208,003,076,036,255
49500 :010,201,222,208,003,076,044
49506 :166,010,096,160,000,132,150
49512 :253,132,254,177,251,240,131
49518 :030,201,039,208,004,192,016
49524 :000,208,012,201,027,144,196
49530 :008,201,065,144,014,201,243
49536 :091,176,010,153,111,018,175
49542 :200,132,253,192,032,144,063
49548 :222,024,096,165,252,197,072
49554 :175,144,004,165,251,197,058
49560 :174,096,032,144,009,176,015
49566 :019,165,253,208,002,230,011
49572 :253,024,165,251,101,253,187
49578 :133,251,165,252,105,000,052
49584 :133,252,096,032,155,009,085
49590 :176,033,165,166,101,253,052
49596 :133,166,201,040,176,010,146
49602 :168,177,170,041,015,205,202
49608 :031,008,208,006,169,000,110
49614 :133,166,240,008,032,102,119
49620 :009,165,253,240,218,096,169
49626 :166,167,232,138,032,056,241
49632 :011,032,144,009,176,243,071
49638 :134,167,224,025,144,006,162
49644 :032,209,014,076,102,009,166
49650 :165,168,105,040,133,168,253
49656 :133,170,165,169,105,000,222
49662 :032,068,010,208,054,240,098
49668 :213,165,167,201,002,176,160
49674 :003,076,032,011,198,167,241
49680 :165,168,233,040,133,168,155
49686 :133,170,165,169,233,000,124
49692 :032,068,010,208,024,240,098
49698 :226,164,166,208,007,165,202
49704 :167,201,002,176,006,096,176
49710 :032,117,010,208,006,169,076
49716 :039,133,166,208,204,132,166
49722 :166,132,253,032,054,011,194
49728 :076,166,009,133,169,041,146
49734 :003,009,216,133,171,164,254
49740 :166,177,170,041,015,205,082
49746 :031,008,208,003,136,016,228
49752 :244,177,168,201,032,208,094
49758 :032,192,039,176,017,177,215
49764 :170,041,015,205,031,008,058
49770 :240,008,200,177,168,201,076
49776 :032,240,236,096,136,177,005
49782 :168,201,032,208,004,192,155
49788 :000,208,245,192,000,240,241
49794 :008,136,177,168,201,032,084
49800 :208,245,200,177,168,201,055
49806 :032,096,032,117,011,162,080
49812 :000,189,111,018,009,128,091
49818 :153,000,004,200,232,228,203
49824 :248,144,242,200,096,032,098
49830 :032,011,160,000,177,170,204
49836 :041,015,205,031,008,240,200
49842 :032,205,033,008,208,022,174
49848 :032,058,010,169,160,141,242
49854 :000,004,032,102,009,132,213
49860 :248,032,159,015,024,165,071
49866 :166,101,253,168,200,192,002
49872 :040,144,215,230,167,165,145
49878 :167,201,025,176,012,165,192
49884 :170,105,040,133,170,144,214
49890 :197,230,171,208,193,169,114
49896 :025,032,056,011,032,144,020
49902 :009,176,040,165,251,141,252
49908 :066,003,165,252,141,067,170
49914 :003,208,010,165,176,141,185
49920 :066,003,165,177,141,067,107
49926 :003,169,147,032,210,255,054
49932 :162,085,032,151,011,032,229
49938 :032,011,032,059,014,144,054
49944 :251,032,032,011,076,117,031
49950 :011,169,040,133,168,133,172
49956 :170,169,004,133,169,169,082
49962 :216,133,171,169,000,133,096
49968 :166,169,001,133,167,165,081
49974 :167,010,168,185,064,003,139
49980 :133,251,200,185,064,003,128
49986 :133,252,096,162,204,032,177
49992 :151,011,032,170,011,201,136
49998 :089,208,035,165,176,141,124
50004 :008,032,165,177,141,009,104
50010 :032,056,165,174,233,001,239
50016 :141,023,032,165,175,233,097
50022 :000,141,024,032,169,015,227
50028 :032,195,255,104,104,108,138
50034 :022,003,160,039,169,160,155
50040 :153,000,004,173,032,008,234
50046 :153,000,216,136,016,242,121
50052 :169,250,141,000,004,169,097
50058 :186,141,001,004,160,003,121
50064 :096,032,151,015,162,101,189
50070 :032,117,011,189,103,017,107
50076 :208,001,096,153,000,004,106
50082 :232,200,208,243,032,154,207
50088 :011,032,228,255,201,000,127
50094 :240,249,096,162,016,169,082
50100 :000,133,248,133,254,240,164
50106 :007,032,145,010,162,032,062
50112 :160,003,134,247,132,249,093
50118 :169,004,133,250,160,000,146
50124 :177,249,072,041,127,145,247
50130 :249,132,165,032,170,011,201
50136 :133,255,165,254,016,005,020
50142 :032,145,010,132,254,164,191
50148 :165,104,145,249,165,255,031
50154 :166,254,201,013,208,001,053
50160 :096,201,157,208,005,136,019
50166 :048,210,016,210,201,020,183
50172 :240,071,196,247,176,202,104
50178 :201,192,144,004,201,224,200
50184 :144,037,201,029,208,007,122
50190 :196,248,176,186,200,144,140
50196 :183,201,032,144,179,201,192
50202 :064,144,016,201,096,144,179
50208 :010,201,148,240,067,224,154
50214 :000,240,163,208,105,041,027
50220 :191,009,128,145,249,041,039
50226 :127,224,000,208,002,165,008
50232 :255,153,111,018,200,196,221
50238 :248,144,139,132,248,176,125
50244 :135,192,000,240,028,132,027
50250 :255,177,249,190,111,018,050
50256 :136,145,249,138,153,111,244
50262 :018,164,255,196,248,176,119
50268 :003,200,144,233,198,248,094
50274 :164,165,136,076,205,011,087
50280 :165,248,197,247,176,035,148
50286 :168,132,255,177,249,190,001
50292 :111,018,200,145,249,138,209
50298 :153,111,018,164,255,196,251
50304 :165,240,003,136,016,233,153
50310 :169,160,145,249,169,032,034
50316 :153,111,018,230,248,076,208
50322 :205,011,201,134,240,020,189
50328 :201,140,176,245,201,135,226
50334 :208,001,096,201,138,144,178
50340 :236,240,005,104,104,076,161
50346 :117,011,164,248,204,035,181
50352 :008,176,014,032,149,011,054
50358 :162,154,032,167,011,032,228
50364 :145,010,076,203,011,162,027
50370 :160,142,000,004,201,138,071
50376 :240,006,032,159,015,076,216
50382 :203,011,169,000,133,254,208
50388 :032,042,015,169,250,141,093
50394 :000,004,165,254,240,006,119
50400 :173,033,008,141,000,216,027
50406 :230,254,076,203,011,165,145
50412 :253,208,001,096,032,182,240
50418 :011,056,165,253,229,248,180
50424 :240,005,176,036,076,171,184
50430 :013,162,000,024,138,168,247
50436 :101,166,133,255,189,111,191
50442 :018,145,251,164,255,145,220
50448 :168,173,032,008,145,170,200
50454 :232,228,248,144,231,134,215
50460 :253,076,117,011,133,255,105
50466 :165,248,208,002,230,255,118
50472 :165,174,229,255,133,174,146
50478 :165,175,233,000,133,175,159
50484 :165,252,133,250,166,251,245
50490 :165,248,208,007,202,224,088
50496 :255,208,002,198,250,134,087
50502 :249,164,255,177,249,160,044
50508 :000,145,249,166,249,232,093
50514 :208,002,230,250,228,174,150
50520 :208,235,165,250,197,175,038
50526 :208,229,166,167,232,138,210
50532 :010,168,056,185,064,003,074
50538 :229,255,153,064,003,200,242
50544 :185,064,003,233,000,153,238
50550 :064,003,224,025,144,230,040
50556 :024,165,166,133,165,101,110
50562 :255,168,132,255,177,168,005
50568 :072,177,170,164,165,145,005
50574 :170,104,145,168,230,165,100
50580 :164,255,200,192,040,144,119
50586 :233,164,165,032,192,014,186
50592 :165,248,240,003,076,000,124
50598 :013,076,117,011,073,255,199
50604 :133,255,230,255,165,174,104
50610 :133,249,101,255,133,174,199
50616 :165,175,133,250,105,000,244
50622 :133,175,160,000,177,249,060
50628 :164,255,145,249,166,249,144
50634 :208,002,198,250,202,134,172
50640 :249,228,251,208,235,165,008
50646 :250,197,252,208,229,166,236
50652 :167,232,138,010,168,024,191
50658 :185,064,003,101,255,153,219
50664 :064,003,200,185,064,003,239
50670 :105,000,153,064,003,224,019
50676 :025,144,230,032,000,013,176
50682 :162,006,181,165,157,059,212
50688 :003,202,208,248,134,166,193
50694 :166,167,232,138,032,056,029
50700 :011,133,250,165,251,133,187
50706 :249,032,054,011,032,059,199
50712 :014,176,012,165,251,197,071
50718 :249,208,229,165,252,197,050
50724 :250,208,223,162,006,189,050
50730 :059,003,149,165,202,208,060
50736 :248,168,076,058,010,032,128
50742 :155,009,176,057,032,102,073
50748 :009,170,192,000,240,032,191
50754 :024,152,101,166,201,040,238
50760 :176,041,204,035,008,144,168
50766 :003,032,042,015,160,000,074
50772 :132,255,032,169,014,164,082
50778 :255,200,196,253,144,244,102
50784 :176,211,032,173,014,165,099
50790 :166,201,040,176,005,138,060
50796 :201,031,208,197,032,155,164
50802 :009,164,166,032,192,014,179
50808 :169,000,133,166,230,167,217
50814 :165,167,010,168,165,251,028
50820 :153,064,003,200,165,252,201
50826 :153,064,003,032,144,009,031
50832 :176,021,165,167,201,025,131
50838 :176,015,165,168,105,040,051
50844 :133,168,133,170,144,005,141
50850 :230,169,230,171,024,096,058
50856 :177,251,005,254,164,166,161
50862 :145,168,173,032,008,005,193
50868 :254,016,003,173,033,008,155
50874 :145,170,230,166,096,192,161
50880 :040,144,001,096,169,032,162
50886 :145,168,173,031,008,145,100
50892 :170,200,208,239,032,032,061
50898 :011,162,001,024,165,168,229
50904 :133,247,133,249,105,040,099
50910 :133,168,133,170,165,169,136
50916 :133,248,165,171,133,250,048
50922 :144,004,230,169,230,171,158
50928 :160,039,177,168,145,247,152
50934 :177,170,145,249,136,016,115
50940 :245,232,224,024,144,211,052
50946 :162,001,138,010,168,185,154
50952 :066,003,153,064,003,200,241
50958 :185,066,003,153,064,003,232
50964 :232,224,025,144,235,160,016
50970 :000,032,192,014,032,037,077
50976 :015,032,059,014,169,024,089
50982 :076,052,011,136,132,255,188
50988 :173,111,018,009,064,141,048
50994 :094,018,169,001,162,008,246
51000 :160,008,032,186,255,169,098
51006 :007,162,092,160,018,032,021
51012 :189,255,032,192,255,162,129
51018 :001,032,198,255,032,207,031
51024 :255,160,000,165,144,208,244
51030 :049,032,207,255,200,196,001
```

```
51036 :255,144,006,201,128,144,202
51042 :024,041,127,201,128,176,027
51048 :232,141,115,015,185,111,135
51054 :018,041,063,201,000,208,129
51060 :006,196,255,144,218,240,151
51066 :027,165,144,208,009,032,195
51072 :207,255,201,128,176,203,018
51078 :144,243,201,064,240,006,008
51084 :032,059,017,076,117,011,196
51090 :169,128,133,254,169,001,232
51096 :032,195,255,076,204,255,145
51102 :136,132,255,173,111,018,215
51108 :009,064,141,101,018,169,154
51114 :001,162,008,160,008,032,029
51120 :186,255,169,005,162,099,028
51126 :160,018,032,189,255,032,100
51132 :192,255,162,001,032,201,007
51138 :255,160,000,200,185,111,081
51144 :018,041,063,196,255,144,149
51150 :002,009,128,032,210,255,074
51156 :196,255,144,237,032,059,111
51162 :017,240,003,076,145,010,197
51168 :032,151,015,032,145,010,097
51174 :162,230,134,254,032,154,172
51180 :011,096,162,078,032,151,254
51186 :011,162,048,032,167,011,161
51192 :201,013,208,067,162,183,058
51198 :032,151,011,162,192,032,066
51204 :154,011,032,178,011,165,043
51210 :248,240,050,032,026,017,111
51216 :208,234,169,001,162,008,030
51222 :160,001,032,186,255,024,168
51228 :169,002,101,248,162,109,051
51234 :160,018,032,189,255,169,089
51240 :176,166,174,164,175,032,159
51246 :216,255,144,005,032,059,245
51252 :017,208,197,032,145,010,149
51258 :162,237,032,167,011,076,231
51264 :117,011,162,188,032,151,213
51270 :011,032,178,011,165,248,203
51276 :240,241,032,026,017,208,072
51282 :239,169,001,162,008,160,053
51288 :008,032,186,255,162,000,219
51294 :164,248,189,104,018,153,202
51300 :111,018,200,232,224,004,121
51306 :144,244,200,200,152,162,184
51312 :109,160,018,032,189,255,107
51318 :032,192,255,162,001,032,024
51324 :198,255,032,207,255,133,180
51330 :176,133,174,165,144,208,106
51336 :043,032,207,255,133,177,215
51342 :133,175,201,032,144,019,078
51348 :160,000,165,144,208,022,079
51354 :032,207,255,145,174,230,173
51360 :174,208,243,230,175,208,118
51366 :239,032,146,011,232,032,090
51372 :167,011,208,146,201,064,201
51378 :240,005,032,059,017,208,227
51384 :137,032,151,015,162,042,211
51390 :032,151,011,032,228,255,131
51396 :201,013,208,249,032,026,157
51402 :017,208,239,169,001,162,230
51408 :008,160,008,032,186,255,089
51414 :169,002,162,091,160,018,048
51420 :032,189,255,032,192,255,151
51426 :162,001,032,198,255,160,010
51432 :142,032,207,255,136,208,188
51438 :250,165,144,240,005,032,050
51444 :059,017,208,196,032,207,195
51450 :255,041,063,009,128,217,195
51456 :152,017,208,011,200,192,012
51462 :015,144,239,032,151,015,090
51468 :076,254,010,032,146,011,029
51474 :162,134,032,167,011,208,220
51480 :163,169,015,032,195,255,085
51486 :032,204,255,169,160,141,223
51492 :000,004,169,015,168,162,042
51498 :008,032,186,255,169,003,183
51504 :162,108,160,018,032,189,205
51510 :255,032,192,255,032,204,000
51516 :255,162,015,032,198,255,209
51522 :032,207,255,133,255,201,125
51528 :048,208,003,076,204,255,098
51534 :032,149,011,165,255,009,187
51540 :128,153,000,004,200,032,089
51546 :207,255,201,013,208,243,193
51552 :032,151,015,076,170,011,039
51558 :211,144,133,133,132,250,081
51564 :186,160,211,144,133,140,058
51570 :140,137,142,135,160,195,255
51576 :136,133,131,139,133,146,170
51582 :160,134,143,146,160,211,056
51588 :144,133,133,132,211,131,248
51594 :146,137,144,148,032,000,233
51600 :201,142,147,133,146,148,037
51606 :160,132,137,131,148,137,227
51612 :143,142,129,146,153,160,005
51618 :132,137,147,139,160,166,019
51624 :160,136,137,148,160,210,095
51630 :197,212,213,210,206,000,188
51636 :210,133,141,143,150,133,066
51642 :000,208,140,133,129,147,175
51648 :133,160,151,129,137,148,026
51654 :160,174,174,174,000,197,053
51660 :146,146,143,146,186,160,107
51666 :000,201,142,150,129,140,204
51672 :137,132,160,147,148,129,045
51678 :146,148,137,142,135,160,066
51684 :129,132,132,146,133,147,023
51690 :147,000,201,142,131,143,230
51696 :146,146,133,131,148,160,080
51702 :132,137,147,139,160,142,079
51708 :129,141,133,000,205,149,241
51714 :147,148,160,136,129,150,104
51720 :133,160,129,148,160,140,110
51726 :133,129,147,148,160,128,091
51732 :160,140,133,148,148,133,114
51738 :146,147,000,211,129,150,041
51744 :133,000,204,143,129,132,005
51750 :160,134,137,140,133,142,116
51756 :129,141,133,186,160,000,025
51762 :197,152,137,148,186,160,006
51768 :129,146,133,160,153,143,152
51774 :149,160,147,149,146,133,178
51780 :160,155,217,175,206,157,114
51786 :191,000,129,132,132,133,023
51792 :132,174,000,147,129,150,044
51798 :133,132,174,000,036,048,097
51804 :058,000,044,083,044,082,147
51810 :048,058,000,044,065,044,101
51816 :080,044,082,073,048,058,233
```

All Commodore 64 programs in this issue work with the Commodore 128 in 64 mode.

MLX: 64 Version

Article on page 142.

```
10 REM LINES CHANGED FROM MLX
   {SPACE}VERSION 2.00 ARE 750
   ,765,770 AND 860      :rem 50
20 REM LINE CHANGED FROM MLX V
   ERSION 2.01 IS 300 :rem 147
100 PRINT"{CLR}{6}";CHR$(142);
    CHR$(8);:POKE53281,1:POKE5
    3280,1               :rem 67
101 POKE 788,52:REM DISABLE RU
    N/STOP               :rem 119
110 PRINT"{RVS}{39 SPACES}";
                         :rem 176
120 PRINT"{RVS}{14 SPACES}
    {RIGHT}{OFF}{*}£{RVS}
    {RIGHT} {RIGHT}{2 SPACES}
    {*}{OFF}{*}£{RVS}£{RVS}
    {14 SPACES}";        :rem 250
130 PRINT"{RVS}{14 SPACES}
    {RIGHT} {G}{RIGHT}
    {2 RIGHT} {OFF}£{RVS}£
    {*}{OFF}{*}{RVS}
    {14 SPACES}";        :rem 35
140 PRINT"{RVS}{41 SPACES}"
                         :rem 120
200 PRINT"{2 DOWN}{PUR}{BLK} M
    ACHINE LANGUAGE EDITOR VER
    SION 2.02{5 DOWN}":rem 238
210 PRINT"{5}{2 UP}STARTING AD
    DRESS?{8 SPACES}{9 LEFT}";
                         :rem 143
215 INPUTS:F=1-F:C$=CHR$(31+11
    9*F)                 :rem 166
220 IFS<256OR(S>40960ANDS<4915
    2)ORS>53247THENGOSUB3000:G
    OTO210               :rem 235
225 PRINT:PRINT:PRINT    :rem 180
230 PRINT"{5}{2 UP}ENDING ADDR
    ESS?{8 SPACES}{9 LEFT}";:I
    NPUTE:F=1-F:C$=CHR$(31+119
    *F)                  :rem 20
240 IFE<256OR(E>40960ANDE<4915
    2)ORE>53247THENGOSUB3000:G
    OTO230               :rem 183
250 IFE<STHENPRINTC$;"{RVS}END
    ING < START{2 SPACES}":GOS
    UB1000:GOTO 230      :rem 176
260 PRINT:PRINT:PRINT    :rem 179
300 PRINT"{CLR}";CHR$(14):AD=S
                         :rem 56
310 A=1:PRINTRIGHT$("0000"+MID
    $(STR$(AD),2),5);":";
                         :rem 33
315 FORJ=ATO6            :rem 33
320 GOSUB570:IFN=-1THENJ=J+N:G
    OTO320               :rem 228
390 IFN=-211THEN 710     :rem 62
400 IFN=-204THEN 790     :rem 64
410 IFN=-206THENPRINT:INPUT"
    {DOWN}ENTER NEW ADDRESS";Z
    Z                    :rem 44
415 IFN=-206THENIFZZ<SORZZ>ETH
    ENPRINT"{RVS}OUT OF RANGE"
    :GOSUB1000:GOTO410:rem 225
417 IFN=-206THENAD=ZZ:PRINT:GO
    TO310                :rem 238
420 IF N<>-196 THEN 480
                         :rem 133
430 PRINT:INPUT"DISPLAY:FROM";
    F:PRINT,"TO";:INPUTT
                         :rem 234
440 IFF<SORF>EORT<SORT>ETHENPR
    INT"AT LEAST";S;"{LEFT}, N
    OT MORE THAN";E:GOTO430
                         :rem 159
450 FORI=FTOTSTEP6:PRINT:PRINT
    RIGHT$("0000"+MID$(STR$(I)
    ,2),5);":";          :rem 30
451 FORK=0TO5:N=PEEK(I+K):PRIN
    TRIGHT$("00"+MID$(STR$(N),
    2),3);",";           :rem 66
460 GETA$:IFA$>""THENPRINT:PRI
    NT:GOTO310           :rem 25
470 NEXTK:PRINTCHR$(20);:NEXTI
    :PRINT:PRINT:GOTO310
                         :rem 50
480 IFN<0 THEN PRINT:GOTO310
                         :rem 168
490 A(J)=N:NEXTJ         :rem 199
500 CKSUM=AD-INT(AD/256)*256:F
    ORI=1TO6:CKSUM=(CKSUM+A(I)
    )AND255:NEXT         :rem 200
510 PRINTCHR$(18);:GOSUB570:PR
    INTCHR$(146);        :rem 94
511 IFN=-1THENA=6:GOTO315
                         :rem 254
515 PRINTCHR$(20):IFN=CKSUMTHE
    N530                 :rem 122
520 PRINT:PRINT"LINE ENTERED W
    RONG : RE-ENTER":PRINT:GOS
    UB1000:GOTO310       :rem 176
530 GOSUB2000            :rem 218
540 FORI=1TO6:POKEAD+I-1,A(I):
    NEXT:POKE54272,0:POKE54273
    ,0                   :rem 227
550 AD=AD+6:IF AD<E THEN 310
                         :rem 212
560 GOTO 710             :rem 108
570 N=0:Z=0              :rem 88
580 PRINT"{£}";          :rem 81
581 GETA$:IFA$=""THEN581
                         :rem 95
582 AV=-(A$="M")-2*(A$=",")-3*
    (A$=".")-4*(A$="J")-5*(A$=
    "K")-6*(A$="L")      :rem 41
583 AV=AV-7*(A$="U")-8*(A$="I"
    )-9*(A$="O"):IFA$="H"THENA
```

```
    $="0"                    :rem 134
584 IFAV>0THENA$=CHR$(48+AV)
                             :rem 134
585 PRINTCHR$(20);:A=ASC(A$):I
    FA=13ORA=44ORA=32THEN670
                             :rem 229
590 IFA>128THENN=-A:RETURN
                             :rem 137
600 IFA<>20 THEN 630         :rem 10
610 GOSUB690:IFI=1ANDT=44THENN
    =-1:PRINT"{OFF}{LEFT}
    {LEFT}";:GOTO690         :rem 62
620 GOTO570                  :rem 109
630 IFA<48ORA>57THEN580
                             :rem 105
640 PRINTA$;:N=N*10+A-48
                             :rem 106
650 IFN>255 THEN A=20:GOSUB100
    0:GOTO600                :rem 229
660 Z=Z+1:IFZ<3THEN580       :rem 71
670 IFZ=0THENGOSUB1000:GOTO570
                             :rem 114
680 PRINT",";:RETURN         :rem 240
690 S%=PEEK(209)+256*PEEK(210)
    +PEEK(211)               :rem 149
691 FORI=1TO3:T=PEEK(S%-I)
                             :rem 67
695 IFT<>44ANDT<>58THENPOKES%-
    I,32:NEXT                :rem 205
700 PRINTLEFT$("{3 LEFT}",I-1)
    ;:RETURN                 :rem 7
710 PRINT"{CLR}{RVS}*** SAVE *
    **{3 DOWN}"              :rem 236
715 PRINT"{2 DOWN}(PRESS {RVS}
    RETURN{OFF} ALONE TO CANCE
    L SAVE){DOWN}"           :rem 106
720 F$="":INPUT"{DOWN} FILENAM
    E";F$:IFF$=""THENPRINT:PRI
    NT:GOTO310               :rem 71
730 PRINT:PRINT"{2 DOWN}{RVS}T
    {OFF}APE OR {RVS}D{OFF}ISK
    : (T/D)"                 :rem 228
740 GETA$:IFA$<>"T"ANDA$<>"D"T
    HEN740                   :rem 36
750 DV=1-7*(A$="D"):IFDV=8THEN
    F$="0:"+F$:OPEN15,8,15,"S"
    +F$:CLOSE15              :rem 212
760 T$=F$:ZK=PEEK(53)+256*PEEK
    (54)-LEN(T$):POKE782,ZK/25
    6                        :rem 3
762 POKE781,ZK-PEEK(782)*256:P
    OKE780,LEN(T$):SYS65469
                             :rem 109
763 POKE780,1:POKE781,DV:POKE7
    82,1:SYS65466            :rem 69
765 K=S:POKE254,K/256:POKE253,
    K-PEEK(254)*256:POKE780,25
    3                        :rem 17
766 K=E+1:POKE782,K/256:POKE78
    1,K-PEEK(782)*256:SYS65496
                             :rem 235
770 IF(PEEK(783)AND1)OR(191AND
    ST)THEN780               :rem 111
775 PRINT"{DOWN}DONE.{DOWN}":G
    OTO310                   :rem 113
780 PRINT"{DOWN}ERROR ON SAVE.
    {2 SPACES}TRY AGAIN.":IFDV
    =1THEN720                :rem 171
781 OPEN15,8,15:INPUT#15,E1$,E
    2$:PRINTE1$;E2$:CLOSE15:GO
    TO720                    :rem 103
790 PRINT"{CLR}{RVS}*** LOAD *
    **{2 DOWN}"              :rem 212
795 PRINT"{2 DOWN}(PRESS {RVS}
    RETURN{OFF} ALONE TO CANCE
    L LOAD)"                 :rem 82
800 F$="":INPUT"{2 DOWN} FILEN
    AME";F$:IFF$=""THENPRINT:G
    OTO310                   :rem 144
810 PRINT:PRINT"{2 DOWN}{RVS}T
    {OFF}APE OR {RVS}D{OFF}ISK
    : (T/D)"                 :rem 227
820 GETA$:IFA$<>"T"ANDA$<>"D"T
    HEN820                   :rem 34
830 DV=1-7*(A$="D"):IFDV=8THEN
    F$="0:"+F$               :rem 157
840 T$=F$:ZK=PEEK(53)+256*PEEK
    (54)-LEN(T$):POKE782,ZK/25
    6                        :rem 2
841 POKE781,ZK-PEEK(782)*256:P
    OKE780,LEN(T$):SYS65469
                             :rem 107
845 POKE780,1:POKE781,DV:POKE7
    82,1:SYS65466            :rem 70
850 POKE780,0:SYS65493       :rem 11
860 IF(PEEK(783)AND1)OR(191AND
    ST)THEN870               :rem 111
865 PRINT"{DOWN}DONE.":GOTO310
                             :rem 96
870 PRINT"{DOWN}ERROR ON LOAD.
    {2 SPACES}TRY AGAIN.{DOWN}
    ":IFDV=1THEN800          :rem 172
880 OPEN15,8,15:INPUT#15,E1$,E
    2$:PRINTE1$;E2$:CLOSE15:GO
    TO800                    :rem 102
1000 REM BUZZER              :rem 135
1001 POKE54296,15:POKE54277,45
    :POKE54278,165           :rem 207
1002 POKE54276,33:POKE 54273,6
    :POKE54272,5             :rem 42
1003 FORT=1TO200:NEXT:POKE5427
    6,32:POKE54273,0:POKE5427
    2,0:RETURN               :rem 202
2000 REM BELL SOUND          :rem 78
2001 POKE54296,15:POKE54277,0:
    POKE54278,247            :rem 152
2002 POKE 54276,17:POKE54273,4
    0:POKE54272,0            :rem 86
2003 FORT=1TO100:NEXT:POKE5427
    6,16:RETURN              :rem 57
3000 PRINTC$;"{RVS}NOT ZERO PA
    GE OR ROM":GOTO1000
                             :rem 89
```


BridgePro®

BridgePro is the first program I've seen that provides a challenge for the average-to-excellent bridge player. . . The documentation is excellent and allows a new bridge player to learn the basics.
—Harvey Bernstein, Antic Magazine, Feb. 1985

After having tried three other bridge programs, I find that BridgePro is indeed a pro game. . . It is designed for both the beginner and the advanced player. . . I didn't find anything that could be improved upon.
—Helen Garret, Apple-Dayton Journal, March 1985

If you like to play bridge and don't have three other players ever-eager to play, this software is a must. For bridge freaks it's good enough to justify buying a computer . . . Whether you are a "master" or a beginner, this is great software.
—Christian Basler, NY Commodore Users Group Review, Sept. 1984

BridgePro is designed to let you learn, improve, or just enjoy the card game of bridge. The program provides complete bidding, play and scoring for 1 or 2 players. Features include random hands, bidding help, demonstration mode, hand replay/quit, best hand, auto finish, duplicate mode, and fast machine language speed.

$35 DISK

CA Residents add $2.28 Sales Tax
Add $2 for COD/UPS 2nd Day Air
VISA/MasterCard Welcomed

Commodore 64 • Atari
Apple II • IBM PC/PC jr

Money Back Guarantee
24-Hour Toll Free Orders
1-800-443-0100 ext. 158

Computer Management Corp.
2424 Exbourne Ct.
Walnut Creek, CA 94596
Dealer Inquiries Invited

New!

Now You Can Add
ARTIFICIAL INTELLIGENCE
To Your Programs Using a Powerful Combination

SUPERFORTH 64 +AI

"A professional system thats **easy** for anyone to use"

Easy Programming with English Language Words

By Elliot Schneider & Jack Park

Here's Your Chance to Profit by being on the Forefront, Write 5th Generation Software

AI Module
- Create Intelligent Programs
- Build Expert Systems
- Write Stand Alone License Free Programs
- Construct Rule Bases
- Do Knowledge Engineering
- Use Inference Engines

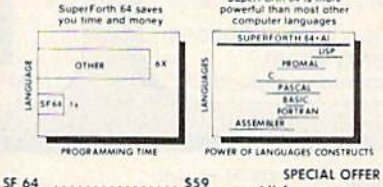
Write Intelligent Programs For:
- Home Use
- Robotics
- Medical Diagnosis
- Education
- Intelligent CAI
- Scientific Analysis
- Data Acquisition
- Data Analysis
- Business
- Real Time Process Control
- Fast Games
- Graphics
- Financial Decisions

Extended Math Module
- Fast ML Floating Point & Integer Math
- Double Precision 2E±38 with Auto. Sci Not.
- n*e* Logx Logе Sin Cos Tan SQR 1/X...
- Matrix and Multidimensional Lattice Math
- Algebraic Expression Evaluator

SUPERFORTH 64
- Interactive Interpreter
- Forth Virtual Memory
- Full Cursor Screen Editor
- Full String Handling
- Trace & Decompiler
- Conditional Macro Assembler
- 1.6 the Programming Time
- Interactive Compiler
- Ramable Code Generator
- 40K User Memory
- All Commodore File Types
- Conversational User Defined Commands
- 10 to 600x Faster than Basic

Graphics I/O Module
- Hires Plotting
- Split Screen
- Printer Plotter Ctrl
- Sprite Editor
- Turtle Graphics
- Koala Pad Graphics Integrator
- Hires Circle, Line, Arc
- Music Editor
- Sound Control

Easy Control of all I/O...
- RS232 Functions
- Access all C-64 Peripherals
- Interrupt Routines



Great Documentation
- Easy to Read 350 pg. Manual with Tutorials
- Source Screen Provided
- Meets all MVP Forth-79 Industrial Standards
- Personal User Support

A Total Integrated Package for the Commodore 64

SF 64	$59
AI Module	$39
Extended Math Module	$39
Graphics I/O Module	$29
Package Price Only	**$99**

SPECIAL OFFER
All for only **$99.00**
(Disk & Manual)

• $3.00 Ship U.S.A. • $20.00 C.O.D. U.S.A.
• $15.00 EUROPE

See Your Local Computer Store or CALL TOLL FREE (800) 633-6335
IN CALIF. CALL (415) 651-3160

PARSEC RESEARCH
Box 1766 Fremont, CA 94538
Dealer Inquiries Invited

Commodore 64 TM of Commodore • Parsec Research PARSEC RESEARCH 41805 ALBRAE ST. FREMONT, CA 94538

Sensational Prices!
. . . On Our Most Popular Items!

from microPal® . . .

THE 79¢ DISKETTE

Are you paying too much for diskettes? Try our first quality, prime, 5¼" diskettes (no rejects, no seconds) at these fantastic sale prices and save, save, SAVE! Disks are packaged in boxes of 50; each box contains 5 shrink-wrapped 10-packs that include diskettes in sleeves, labels, and write-protect tabs.

Each diskette is certified to be 100% error free and comes with a lifetime warranty (if you have a problem, we'll replace the diskette). All diskettes include hub reinforcement rings and write-protect notch.

All diskettes are double density and work in either single or double density drives.

SS, DD Diskettes, Box of 50
32391 **$39.50**–79¢ ea.!

DS, DD Diskettes, Box of 50
32403 **$49.50**–99¢ ea.!

TIED UP BY PRINT TIME?

U BUFF™ UNIVERSAL BUFFER

Imagine printing a lengthy document in seconds instead of minutes . . . freeing your computer for other tasks! We are thoroughly impressed with the U Buff 64K printer buffer from Digital Devices. Just connect it between your parallel interface and your printer and it's ready for work! Its speed and versatility make it a valuable accessory for anyone with heavy printing needs.

U Buff receives print data at rates up to 4800 cps and then send it to the printer at the printer's own print rate. With 64K of usable RAM, the buffer has enough memory to hold approximately 32 pages of data. Think of the increase in personal productivity—while the printer is still working on one document, the next one can be loaded and edited! Because the U Buff has its own power supply, it will continue to hold data even if the computer or printer is turned off, or is off line. U Buff comes complete with cables, power supply and comprehensive instruction manual. A one year limited warranty and full customer support are also included.

34888 U Buff 64K Printer Buffer **ONLY $99.95**

COMPUTERFACTS™ from SAMS

Technical Service Data for Your Computer and Peripherals

Sams introduces COMPUTERFACTS™ packets of information that reveal the inner workings of major brand micros, monitors, printers and disk drives. Includes schematic wiring diagrams, parts lists, disassembly instructions, troubleshooting techniques, and other repair data.

33477 Commodore 64 Computer
33513 VIC-20 Computer
33551 Commodore Plus/4 Computer
33481 Commodore 1541 Disk Drive
33496 Commodore 1525 Printer
33508 Commodore C16 Computer
33546 Commodore 1701 Monitor

All packets $17.95 each

LETTER QUALITY PRINTING FOR $199!!

We have made a special purchase of these high quality daisy wheel printers from a major printer manufacturer, and can offer them to you at this incredible price! All printers are brand new, and feature a full 1 year manufacturer's warranty!

Print superb letter quality type in standard, bold, subscript, superscript and underlined characters for full word-processing compatibility at 10 CPS, bidirectional. Friction feed with a tractor feed option. This much quality at such a low price is a "don't miss" bargain! *Sug. Retail $319.00*

34451 Letter Quality Printer **$199.00**

Get Your Computer Talking!

THE VOICE MESSENGER SPEECH 64

This plug-in speech synthesizer from Welwyn will have your C-64 talking in no time! Add speech to your BASIC programs . . . also includes direct text to speech capability. Choose from two voices, each with intonation. Includes manual and built-in software.

34939 **Save!** **$49.95**

Command Your Computer By Voice!

NEW

Give your computer voice recognition capability with the **VOICE COMMAND MODULE** from Eng Manufacturing. The unit plugs into the C-64's RS-232 port via cable (included); a clip-on lapel microphone attaches to the module with a 6' wire. As you speak into the microphone the machine captures a sample of the voice, compares it to a stored pre-recorded sample, and decides if it matches. Stores up to 64 different words for later recall. Package also includes a disk of software programs (includes SOS – Speech Operating System) and a user's manual. Requires disk drive. Compatible with C-128 computer.

34943 **ONLY $43.95**

CARTRIDGE EXPANDER

Plus $22.95 FAST LOAD OFFER!

Stop wearing out your computer and cartridges by endless swapping! The Navarone cartridge expander features 3 cartridge slots. Select any cartridge, or the "off" position if no cartridge is to be used. Reset the computer independently of the power switch. Cartridge slots are vertical for easy access—no blind fumbling behind the computer.

33227 Cartridge Expander **$22.95**

The cartridge expander is a great companion for the Epyx Fast Load cartridge—you can keep it permanently installed plus have two slots free for other cartridges!

34216 Fast Load Cartridge (Sug. Retail $34.95) **$29.95**

Fast Load ONLY $22.95 with purchase of cartridge expander!

DUST COVER and "EVERYTHING BOOK" SPECIAL OFFER

Get to know us by ordering this great dust cover for your VIC-20 or Commodore 64 and our catalog, "The Everything Book for the Commodore C-64 and VIC-20 Home Computers," for $2.95 (no extra shipping and handling charges). Cover is antistatic, translucent 8 gauge vinyl sewn to our exacting standards with reinforced seams. Discover the savings and easy shipping available from TENEX Computer Express!

$2.95

31627 Dust Cover and Catalog (G1J)

SPACE SAVING PRINTER STAND!

At last a printer stand priced for homes and small offices! This great new stand from Suncom is elevated so you can place your paper underneath.

Features heavy duty welded steel wire construction and has a vinyl coating to reduce noise and vibration. Another plus . . . the printer is held at an angle that makes it much easier to see your output as it is being printed.

Available in two widths: 12" for most 80 column printers, and 18" for most 132 column printers.

33232 12" Printer Stand **$14.95**
33246 18" Printer Stand **$22.95**

From Your Friends At
TENEX Computer Express

We gladly accept mail orders!

P.O. Box 6578
South Bend, IN 46660

Questions? Call 219/259-7051

Ad G1J

SHIPPING CHARGES

ORDER AMOUNT	CHARGE
less than $20.00	$3.75
$20.00–$39.99	4.75
$40.00–$74.99	5.75
$75.00–$149.99	6.75
$150.00–$299.99	7.75
$300 & up	8.75

MasterCard VISA

NO EXTRA FEE FOR CHARGES

NO HIDDEN EXTRAS

ORDER TOLL FREE
1-800-348-2778

Sensational Prices!
. . . On Our Most Popular Items!

The Right Interface For All Your Printing Needs!!

PPI with graphics — This high-performance graphics parallel printer interface from DSI for C-64 and VIC-20 emulates a Commodore printer. Comes complete with all necessary cables for quick installation and includes easy-to-follow user's manual.

33565 **$44.95**

GWI Interface — Built-in buffer provides super high-speed printing for parallel printers. Dumps high-resolution screens up to 18 times faster. Prints all Commodore characters. All cables and connectors included. From Cardco. Lifetime warranty.

34484 **$CALL**

Cardprint + G — Top of the line parallel interface from Cardco. Full graphics capability. Prints full Commodore character set including graphics. Controls automatic line feed . . . and much more! Includes all necessary cables and connections. Lifetime guarantee.

20623 **$CALL**

Ready . . . Set . . . PRINT!
PRINTER PLUS GRAPHICS INTERFACE
ONLY $189!!

We've combined a famous name printer with an outstanding graphics interface to offer a complete printer package for your C-64 at an unbeatable value! Similar systems can cost $300 and up . . . but due to our high volume you pay ONLY $189!!

You get a standard printing speed of 100 CPS along with Near Letter Quality *and* compressed print modes available at the flip of a switch. Printing is bi-directional and logic seeking. Both friction and tractor feed are standard—handles original plus two copies.

Other features include graphics printing (compatible with almost all popular graphics software programs), programmable line spacing, and more!

Dimensions: 15.5″ W × 11″ D × 4″ H″. Weight: 10.8 lbs.

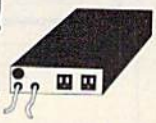
Here's another plus—the parallel, Centronics compatible printer can be used with *any* parallel output computer . . . lets the printer do double duty, or more!

90 days parts and labor warranty with a lifetime warranty on the printhead.

35044 Printer Plus Graphics Interface **$189.00**

Supply is limited — call now!

POWER and PROTECTION FOR YOUR C-64!



POW'R PAK 64

Pow'r Pak is a replacement power supply (1.5 amp) for the Commodore 64 . . . but that's not all! Pow'r Pak also supplies two additional surge protected outlets (120V) for monitor, disk drive, or other peripherals. On/off switch. Fuse protection. Sturdy all-metal casing is ventilated for heat dissipation. Full 1 year warranty.

34910 **$49.95**

star

SG-10

Lowest Price! 33251 **$CALL**

Also: 34446 **SG-10C** with Built-In Commodore Interface! **$CALL**

NEW **EPSON LX-90 plus Interface** Plug-in-and-Print!!

100 CPS dot matrix printer also offers Near Letter Quality printing at 16 CPS. Friction and tractor feed. No other cables or interfaces required!

35011 LX-90 Printer **$CALL**
35025 Commodore Interface **$44.95**
Also: **New FX-85 & FX-185! LX-80** **$CALL**

We stock a complete line of Star, Epson, BMC, and Axiom peripherals. Call for best prices!

The Most Complete Disk Drive You Can Buy

Includes Word Processor, Spread Sheet, and Data Base Manager

INDUS GT ONLY $229

State-of-the-art disk drive for C-64 and VIC-20 features LED sector indicator, electronic write-protect, built-in wedge, and operating speeds up to 400% faster. Package includes cables and power supply, carrying case that doubles as a disk storage file AND software starter package featuring word processor, spreadsheet, and database manager program!

FULL YEAR PARTS AND LABOR WARRANTY!!

33443 Indus GT Disk Drive ONLY **$229**

NEW from GE

Computer Data Recorder

New compact, space-saving data recorder from GE includes Interface Module and cables for direct connection to Commodore (and even Atari) computer systems!! Features include digital counter, monitor speaker, battery level indicator, AC converter.

Sug. Retail $69.95

34592 ONLY **$39.95**

WHAT DO YOU GET A COMPUTER ENTHUSIAST FOR CHRISTMAS?

A Gift Certificate from TENEX Computer Express!!

Give a gift you *know* will be appreciated . . . a gift certificate and a copy of our catalog filled with computer software, hardware and accessories!

Gift certificates are available for $25, $50, $75, $100, etc. (in multiples of $25). Please specify Commodore or TI 99/4A catalog. Let us know if you would like the certificate and catalog sent to you, or directly to the gift recipient.

34981 **Christmas Gift Certificate**

From Your Friends At

TENEX Computer Express

We gladly accept mail orders!

P.O. Box 6578
South Bend, IN 46660

Questions? Call
219/259-7051

Ad G1J

SHIPPING CHARGES

ORDER AMOUNT	CHARGE
less than $20.00	$3.75
$20.00–$39.99	4.75
$40.00–$74.99	5.75
$75.00–$149.99	6.75
$150.00–$299.99	7.75
$300 & up	8.75

MasterCard VISA

NO EXTRA FEE FOR CHARGES

NO HIDDEN EXTRAS

ORDER TOLL FREE
1-800-348-2778

GUARANTEED SOFTWARE

NEW NEW

VIZASTAR for the C128

Vizastar, the integrated spreadsheet, database and graphics program that has the Commodore 64 world raving, is now available for the C128. It boasts 80 columns, and has over 40K of free memory in the spreadsheet. Those who already own Vizastar 64 will be pleased to know that your existing files can be read by Vizastar 128. Also, you can upgrade to the 128 version. Call us for details and pricing.

"The only other comparable product would be Lotus 1-2-3 for the IBM PC; nothing in the C64 world comes even close to the features of Vizastar."

AHOY July 85

"I found Vizastar would do anything Lotus 1-2-3 could, and then some. It's my Commodore choice to become the standard against which the others will be judged."

INFO 64 Magazine, Issue #7

"Vizastar is an exceptional package that rivals the features of programs such as Lotus 1-2-3 and offers C64 owners the kind of integrated software previously only available for higher-priced systems."

RUN Magazine, June 1985

"I scrutinized, tested and experimented with Vizastar extensively, but could find no weaknesses whatsoever. It is the most comprehensive, most flexible, most powerful and easiest to use integrated software package I've worked with."

Commodore Microcomputer, Sept/Oct 1985

"I use an IBM PC at work with Lotus 123. I feel Vizastar is just as good and in someways better than 1-2-3."

Steven Roberson, NC. End User

"I have used Multiplan and Superbase; both are good pieces of software, but are inadequate when compared to Vizastar."

Jim Mathews, WA. End User

"So good, I bought a second C64 and Vizastar for my office. A wild bargain! You've saved me from having to buy IBM and Lotus."

Philip Ressler, MA. End User

VIZAWRITE CLASSIC for C128

This is the new word processor from Vizastar's author, Kevin Lacy and is the successor to Omniwriter, which he also wrote. All the features of Omniwriter are there, plus many significant enhancements, like auto pagination, on-line help, pull-down menus, full-function calculator and more. Up to 8 'newspaper-style' variable-width columns can help with newsletters.

Three different proportionally-spaced "near letter quality" fonts are also built-in for use with Commodore or Epson compatible printers. You can merge almost any other word processor file directly into Vizawrite, including Paper Clip and Omniwriter. Naturally, it is also compatible with Vizastar. At all times, what you see on the screen is exactly the way it will be printed out. Vizawrite can do mail-merges and has an integrated 30,000 word spelling checker that you can expand yourself.

PROGRAM SPECIFICATIONS

Both Vizawrite and Vizastar are written in 100% machine language and run in the 128's FAST mode, making it lightning fast. They require a C128 with 80 column color or monochrome monitor. Both come with a cartridge, a diskette, a backup, and a reference manual. Vizastar also includes a 50 page tutorial book. Both work with 1541 or 1571 disk drives.

RISK-FREE OFFER

Vizastar 128 is priced at $119.97. Vizawrite's price is $79.97, but as an introductory offer, it is now only $69.97. Vizastar 64 XL8 is now available for $119.97. We are so positive you will be satisfied with our programs that we offer a 15-day money-back guarantee. Try it Risk-Free. Call us today or send a check or money order. VISA/MC accepted.

Calif. residents add 6.5% Sales Tax.
Add P&H: UPS-$4; COD/Canada-$7.

SOLID STATE SOFTWARE

1125 E. Hillsdale Blvd., Suite 104
Foster City, CA 94404-1609
(415) 341-5606

• Dealer Inquiries Welcome •

Trademarks: Lotus 1-2-3/Lotus Development. Commodore 64/Commodore Electronics Ltd. Multiplan/Microsoft

CONVERSE WITH YOUR COMPUTER

AT LAST! A FULL IMPLEMENTATION of the original ELIZA program is now available to run on your personal computer!

Created at MIT in 1966, ELIZA has become the world's most celebrated artificial intelligence demonstration program. ELIZA is a non-directive psychotherapist who analyzes each statement as you type it in and then responds with her own comment or question—and her remarks are often amazingly appropriate!

Designed to run on a large mainframe, ELIZA has never before been available to personal computer users except in greatly stripped down versions lacking the sophistication which made the original program so fascinating.

Now, our new personal computer version possessing the **FULL** power and range of expression of the original is being offered at the introductory price of only $45. And to let you find out how she does it (or teach her to do more) we have included the complete **SOURCE PROGRAM** (written in BASIC) at no extra cost.

Order your copy of ELIZA today and you'll never again wonder how to respond when you hear someone say, "Okay, let's see what this computer of yours can actually do!"

READ WHAT THE EXPERTS SAY ABOUT OUR VERSION OF ELIZA:

"Much more than a mere game... You'll be impressed with ELIZA... A convincing demonstration of Artificial Intelligence." —*PC MAGAZINE*

"Delightful entertainment... An ideal medium for showing off your system." —*MICROCOMPUTING MAGAZINE*

"ELIZA is an astounding piece of software... A fascinating program to use and study." —*BARON'S MICROCOMPUTER REPORTS*

"ELIZA is a great way to introduce your friends to computers... A very funny party game." —*PETER A. McWILLIAMS*

"ELIZA is an exceptional program, one that's fun to use, shows off your machine, and has great historical interest." —*POPULAR COMPUTING MAGAZINE*

"This version of ELIZA is the best we have seen. As a party game, it is unmatched." —*HOME APPLICATIONS FOR THE C-64*

ELIZA IS AVAILABLE IN THE FOLLOWING FORMATS:

- IBM PC, PCjr., PC-XT and all compatibles.
- All Apple II computers (II, II Plus, IIe, IIc)
- Apple Macintosh (Microsoft BASIC required)
- Commodore 64 (specify disk or cassette)
- 5¼ inch or 8 inch disk for all CP/M systems

All versions are $45 and include a six page users manual.

Please add $2.00 shipping and handling to all orders
(California residents please add 6½% sales tax)

ARTIFICIAL INTELLIGENCE RESEARCH GROUP
921 North La Jolla Avenue, Dept. M
Los Angeles, CA 90046
(213) 656-7368 (213) 654-2214
MC, VISA and checks accepted

STOP SOFTWARE PIRACY Using Safeguard 64 Disks

- Renders Bit and Nibbler Copiers Ineffective
- Software is Encrypted and Protected on Each Disk
- For Commodore 64

Why should your valuable data or useful software program become available in the Public Domain?

Call or write for more information.

GLENCO ENGINEERING INC.
3920 Ridge / Arlington Hts., IL 60004
(312) 392-2492

FAST DELIVERY

Call Us For
Fast Service, Experience
and Affordable Prices

Software

Holiday Special

Stunt Flyer.....$21.95
Acro Jet.....$24.94

SUBLOGIC

Flight Simulator..... $31.95
Microprose F-15 Eagle... $21.50
Solo Flight..... $21.50
Jet Simulator..... $29
Kennedy Approach.... $21.50

FAST LOAD
$19.95

WORD PROCESSING

Special of the Month
FLEET SYSTEM 2
Great Buy $48

Special of the Month
Paper Clip..... $49
Paper Clip/Speller.... $64
Home Pak..... $33

BEST SELLERS

1. Summer Games..... $25
2. HitchHikers Guide..... $23
3. Typing Tutor III..... $25
4. Karateka..... $19
5. Mind Prober..... $25
6. Spell It..... $37
7. S'more Basic Rom.... $49.95
8. Sargon III!..... $32
9. Decision in Desert..... $25
10. Home Accountant..... $42

DATA BASES

PFS: File..... $39
Super Base 64..... $48

Special of the Month
The Consultant
$49

SPREAD SHEET

Multiplan..... $59
Homepak..... $34

Hardware

In Stock

C-128..... $297
1571 Disk Drive....$259
1902 Monitor.....$309

Holiday Special
C-128 Computer
& 1571 Disk Drive
$549 GREAT BUY!

Commodore 64..... $139
1530 Datasette..... $39
1541 Disk Drive..... $174
1660 Auto Modem..... $52
1702 Color Monitor..... $164

C-1902 Monitor
$299

Special of the Month
MSD DISK DRIVE
SD1 Disk Drive $209
SD2 Disk Drive $439

INDUS GT
DISK DRIVE
$219

COMPUSERVE STARTER
KIT $21

Great Gift
1541 FLASH
$54.95

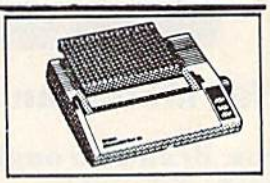
CARDCO 5 SLOT
EXPANDER
$49.95

SG-10 $209

SG-10C $229
SG-15..... $359
SD-10..... $329
SD-15..... $444
SR-10..... $479
SR-15..... $579
Gemini 10x Ribbon $3

Printers

RX-80..... $218
Homewriter 10.... $209
NEW LX-80..... $210
FX-85..... $329
FX-185..... $459
DX-10 Daisywheel ... $245



PANASONIC

1091..... $232
1090..... $185
1092..... $374
1093..... $425

Okidata 182..... $214
Okidata 192..... $349
Okidata 193..... $499

MPS 801 Printer
$119 Reg. $199

SMITH CORONA

Fastext
80 Dot
Matrix
Printer
$149

COMPUTER COVERS

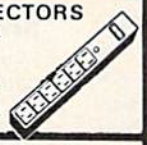
Features heavy duty canvas with vinyl interior - waterproof

Reg. $15.95
$6.99

CMD 64..... $6.99
VIC 20..... $6.99
Disk Drive..... $6.99
Espon MX 80.... $7.99
Espon MX 80 FT $7.99
Okidata 92..... $7.99

SURGE PROTECTORS

1 Outlet..... $14
SPECIAL
4 Outlet.... $24
6 Outlet..... $28



Special Offer

MW-350..... $69
4K Buffer..... $19

PRINTER INTERFACES

Datashare PPI..... $41
Tymac Connection..... $54
Cardco + G Wiz..... $54
MW 302..... $39
Grappler CD..... $84

RIBBONS

Epson MX-80..... $5
Epson M/Rx-100..... $8
SG-10..... $3
SG-15..... $3

DISKS

Special of the Month
BULK SS/DD DISK

10	50	100
$9.99	$48	$90

Maxell SS/DD..... $15.99
Disk Holder (50)... $11.95

Printer Specials

Doodle..... $26
Print Shop..... $29
Print Shop Graphics $18.95
Paper 1000 sheets $19.95
Paper 2500 sheets $34.95

Ordering & Payment Policy

Prices reflect a cash discount. For Visa, and Mastercard add 3% Immediate delivery with certified check or wired funds. N.J. resident add 6%. Prices subject to change.

USA SHIPPING

For shipping and handling add 4% ($4 minimum)
Larger shipments require additional charge. C.O.D. add $3.50

FOR INFORMATION CALL (609) 596-1944 MON.-FRI. 10-5

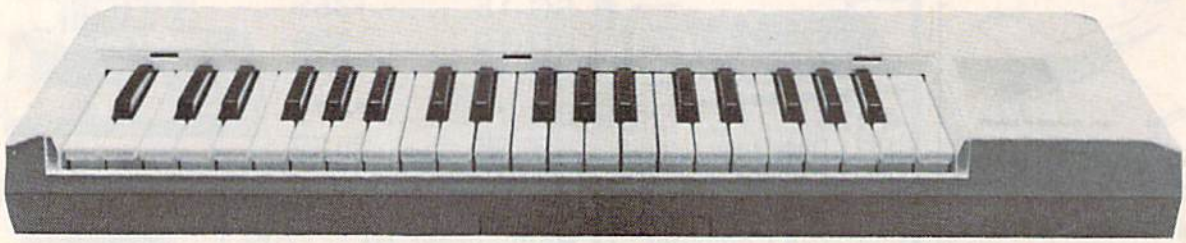
ORDER TOLL FREE (800) 992-3300

Mon., Thurs., Fri. 9-8
Tues., Wed. & Sat. 10-6

PC GALLERY

P.O. Box 3354
Cherry Hill, N.J. 08034

Melodian will teach you to play, compose, record and print music in just one evening!!



The Melodian Musical Keyboard for the Commodore 64 and 128.

A True Breakthrough In Music Education

At last, a program that makes it not only easy but fun to learn music. The Melodian keyboard and software were designed by Harry Mendell who designs custom synthesizer electronics and software for professional musicians such as **Stevie Wonder** and Eric Himy, an award winning concert pianist. The Melodian boasts many of the professional features found only on more expensive equipment. These features include multitrack recording, the ability to create custom instrument sounds and most importantly, ease of use.

Start your lesson with **RhythmMaster** Software. With its built-in metronome, RhythmMaster will display the treble and bass musical staffs and a picture of a piano keyboard. RhythmMaster will then play a measure of music and you must try to play the same measure back on the Melodian keyboard. You're not familiar with the keyboard or can't read music? No problem. RhythmMaster displays the notes you are to play on the musical staff and on the keyboard pictured on the monitor. If you strike the wrong key the note on the musical staff turns red and shows you which key you played wrong, making it ever so easy to correct what you played.

If you should hold a key too long a turtle runs across the screen. Inversely if you should release a key too quickly a rabbit scurries by. If you don't play it correctly RhythmMaster knows it and repeats the measure for you to play.

Sounds easy doesn't it? Now add the fun. You start with six composers (Bach, Handel, Mozart, Beethoven, Schubert and Wagner). The object is to attain the next level of difficulty without losing a composer. You lose a composer each time you accumulate ten mistakes. There are twelve levels of difficulty attainable ranging from tyro to maestro.

ConcertMaster teaches you how to play 35 pre-recorded songs from Bach to Rock. With ConcertMaster you can analyze music note by note, instrument by instrument and learn how a music composition is put together. Then you can compose your own music and record it right onto your floppy disks.

There are nineteen different instrument sounds to choose from in over a seven octave range giving you a wide choice of instruments to suit your musical taste and expression. You can also create your own instrument sounds.

ScoreMaster enables you to print out your music in standard music notation for other musicians to play, or for yourself.

AHOY! Magazine Says . . .

Peggy Herrington of AHOY! said "The system is so easy to use that I didn't need the documation". "It's fun, challenging, and educational, and for playability and ease of use it is nothing short of spectacular."

New York Times Says . . .

Erik Sandberg-Diment of the New York Times states "really useful and instructive item ... Tanya, our 10 year old beginner quickly caught the spirit of matching the dance of her fingers to the measured metronome." "One piece of educational software that, unlike most of its kinfolk, actually delivers. These software-hardware combinations offer a lot of entertainment to the Commodore owner."

RUN Magazine Says . . .

Tom Benford of RUN notes "Whenever a selection of products of the same genre is available, one among the bunch rises head and shoulders above the rest. Such is the case with Melodian ConcertMaster keyboard and software. The combined features of RhythmMaster and ConcertMaster give you a complete music tutorial."

Satisfaction Guaranteed When You Buy Direct

By selling directly to you, we are able to give you the Melodian Keyboard and Software at far lower prices than ever offered before. You take no risk. **If the Melodian keyboard or any of the programs don't please you, for any reason whatsoever, send it back within 60 days for a full refund!**

CREDIT CARD ORDERS, CALL TOLL-FREE **800-327-4566**

IN FLORIDA, **800-351-8777**

© 1985, Melodian, Inc., 970 West McNab Road, Fort Lauderdale, FL 33309. All rights reserved.

Melodian Musical Keyboard kb-01 — $99.95

Keyboard
40 Keys (A-C) in professional gauge spring loaded to give the feel and response of a real keyboard instrument. Polyphonic.

Registers (with ConcertMaster)
Organ, Trumpet, Flute, Clarinet, Piano, Harpsicord, Violin, Cello, Bass, Banjo, Mandolin, Calliope, Concertino, Bagpipe, Synthesizer 1, Synthesizer 2, Clavier 1, Clavier 2, which can be played over a 7 octave range. Programmable sounds as well.

Recording (with ConcertMaster)
Three track sequencer (recorder) with overdubbing and multitimbral (different instrument sounds at the same time) effects.

Interface
Built in interface for Commodore 64, Commodore 128, plugs right in to joystick port no. 2 and user port.

Power Supply
Powered direct by the computer, no batteries and cords required.

Finish
Table Model in white high-impact material, with carrying handle, protective key cover, and built in music stand. Size 29 -1/8 X 9-9/16 X 3-11/16, weighs 9 pounds.

Melodian ScoreMaster sm-01 — $29.95

With the ScoreMaster program your music can be printed out in music notation, which other musicians can read and play. Any music recorded with the ConcertMaster program can be printed by ScoreMaster.

ScoreMaster Requires:
- Commodore 64 or Commodore 128 with disk drive and printer compatible with the Commodore graphics mode such as the Commodore MPS 803, 1515, and 1525.
- Melodian ConcertMaster program.

RhythmMaster Software rm-01 — $29.95

RhythmMaster teaches a beginner how to read music and play it correctly and in rhythm on the musical keyboard.

RhythmMaster will have you reading and playing musical notes in minutes with fun and excitement.

RhythmMaster Features:
- Trumpet, organ, violin, and synthesizer instrument sounds.
- Built in metronome.
- Pause/Play control.
- Set-up menu for customizing RhythmMaster.

RhythmMaster Teaches:
- How to read notes on the treble and bass musical staffs.
- The names of the notes.
- Where the notes are on the keyboard.
- How to play whole notes, half notes, quarter notes, eighth notes and sixteenth notes in combinations, in both 3/4 and 4/4 time.
- How to play in different tempos.

RhythmMaster Requires:
- Commodore 64 or Commodore 128 with disk drive.
- Melodian Musical Keyboard kb-01 is required to study the reading and playing of musical notes. However, RhythmMaster can be used without the Melodian Musical Keyboard to study rhythm, by playing the notes on the computer keyboard.

Programmer's Tool Kit pt-01 — $29.95

Contains programs, and BASIC source listings for reading the Melodian Musical Keyboard, and for reading and creating music files for Melodian ConcertMaster.

ConcertMaster Software cm-01 — $29.95

ConcertMaster teaches how a composition is put together, note by note, instrument by instrument. You learn to play 35 pre-recorded songs from Bach to Rock. Then you can compose your own songs and record them right onto your floppy disk.

ConcertMaster Teaches:
- Scales
- Bass lines
- Familiar Beginner Songs such as "Jingle Bells"
- Easy classical songs such as "Bach Minuet" and Ravel's "Bolero"
- Advanced classics like "A Midsummer's Night Dream" by Mendelssohn
- Popular hits such as "Thriller"

Instruments Sounds
Organ, Trumpet, Flute, Clarinet, Piano, Harpsicord, Violin, Cello, Bass, Banjo, Mandolin, Calliope, Concertina, Bagpipe, Synthesizer 1, Synthesizer 2, Clavier 1, Clavier 2, which can be played over a 7 octave range. Programmable sounds as well.

Recording Functions:
Three track sequencer (recorder) with overdubbing and multitimbral (different instrument sounds at the same time) effects.
Each track can be set to one of seven different functions:
- **Monitor:** Lets you use a track to play music live, without recording it.
- **Record:** Records a track as you play.
- **Playback:** Lets you hear whatever has been recorded or loaded into the track. You may playback one track while recording another to build layers of instruments.
- **Mute:** Turns a track off. This is useful when you want to listen to or record one or two tracks at a time.
- **Save:** Stores a track to the disk.
- **Load:** Loads a track from the disk.
- **Protect:** Write protects a track.

Create New Instrument Sounds
- Choose from pulse, sawtooth, triangle and noise sound sources.
- Control the sound envelope with attack, decay, sustain, and release times.
- Ring Modulation and Syncronization effects.
- Set Low pass, band pass, and high pass filter frequencies.

ConcertMaster Requires:
- Commodore 64 or Commodore 128 with disk drive.
- Melodian Musical Keyboard kb-01 is required to study the reading and playing of musical notes. However, ConcertMaster can be used without the Melodian Musical Keyboard to playback the recorded musical examlpes, record music played on the computer keyboard, and to create new instrument sounds.

For our International customers:
Please send credit card number or international money order in U.S. dollars, or call **305-979-3777.** For Canada and Mexico, add $15.00 for air mail. Overseas add $16.00 for surface mail, and $70.00 for air mail.

MELODIAN™

The new, fast way to learn, play and compose music.

TO ORDER BY MAIL: Fill out coupon, enclose certified check, money order or credit information and mail to P.O. Box 8857, Ft. Lauderdale, FL 33310

PLEASE SEND ME:

☐ Melodian Keyboard	$99.95
☐ RhythmMaster	$29.95
☐ ConcertMaster	$29.95
☐ ScoreMaster	$29.95
☐ Programmer's Tool Kit	$29.95

Add $5.00 Shipping per keyboard.

60 DAY MONEY-BACK GUARANTEE

Recordings:

☐ Christmas Carols	$12.95
☐ Nutcracker Suite	$12.95
☐ Bach's Hits	$12.95
☐ Classical Favorites	$12.95
☐ Demonstration Disk	$9.95

Amount (FL 5% tax) _____

Payment: AMEX, VISA, MC, BankDraft, Check

Credit Card Expir. Date ____/____

Card #: _____

Name _____

Shipping Address _____

City _____

State _____ Zip _____

Telephone _____

COD's and Purchase Orders WILL NOT be accepted by Melodian. Florida residents add 5% sales tax. Please allow one week for delivery.

COMPUTER MAIL ORDER

THE CMO ADVANTAGE

- THE BEST PRICES!
- Next day shipping on all in stock items.
- Free easy access order inquiry.
- Orders from outside Pennsylvania and Nevada save state sales tax.
- Free technicial support with our factory trained technical staff.
- There is no limit and no deposit on C.O.D. orders.
- There's no extra charge for using your credit card. Your card is not charged until we ship.
- No waiting period for cashiers checks.
- We accept purchase orders from qualified corporations. Subject to approval.
- Educational discounts available to qualified institutions.
- FREE CATALOG MEMBERSHIP.

ORDER LINE

1-800-233-8950

In PA 1-800-242-4215

CUSTOMER SERVICE AND TECH SUPPORT

1-717-327-1450

DEPT. A412

MAILING ADDRESS

Computer Mail Order
DEPT. A412
477 East Third Street
Williamsport, PA 17701

MEMBER DIRECT MARKETING ASSOCIATION

CREDIT CARDS

VISA MasterCard AMERICAN EXPRESS DINERS CLUB

SHIPPING

Add 3%, minimum $5.00 shipping and handling on all orders. Larger shipments may require additional charges.

All items subject to availability and price change.

Returned shipments may be subject to a restocking fee.

CANADIAN ORDERS

1-800-268-3974
Ontario/Quebec

1-800-268-4559
Other Provinces

1-416-828-0866
In Toronto

TELEX: 06-218960
2505 Dunwin Drive,
Mississauga, Ontario
Canada L5L1T1

All prices shown are for U.S.A. orders.
Call The Canadian Office for Canadian prices.

SPECIAL

THIS MONTH'S SPECIAL!

The New
EPSON
SPECTRUM LX-80
Dot-Matrix Printer
With Near Letter Quality.
Number one. And built like it.

SOFTWARE

pfs:

File	$59.99

BATTERIES INCLUDED

Paperclip	$59.99
Paperclip w/Spell Pack	$79.99
SpellPak	$39.99
The Consultant	$69.99
Buscard II	$139.99
B.I. 80 Display	$129.00

commodore

Word & Name Machine	$9.99
Pet Emulator	$9.99
Easy Finance I, II, III, IV	$9.99
Gort	$9.99
Screen Editor	$9.99

INFOCOM

Zork I, II, III	$27.99
Deadline	$29.99
Witness	$29.99

ELECTRONIC ARTS

Music Construction	$19.99
Pinball Construction	$19.99
7 Cities of Gold	$25.99
Archon II	$25.99

HESWARE

MultiPlan	$69.99
Games' 84	$16.99
Type 'N' Writer	$14.99
Super Zaxxon	$16.99
Cell Defense	$14.99
OmniWriter/Spell Check	$34.99
Benji Space Rescue	$9.99

Professional Software

Trivia Fever	$29.99
Fleet System II Word Processor	$49.99

SPINNAKER

Snooper Troops 1 or 2	$24.99
Juke Box	$29.99
Up for Grabs	$29.99
Bubble/Burst	$29.99

SUB LOGIC

Flight Simulator II	$39.99

synapse

Pharon's Curse	$16.99
Protector II	$16.99
Sentinel	$16.99

DISKETTES

maxell

5¼" MD-1 SS/DD	$17.99
5¼" MD-2 DS/DD	$23.99
3½" DS/DD (Amiga)	$54.99

Dennison

5¼" Elephant SS/SD EM-1	$13.99

FURNITURE

Bush

CT120 Desk/Printer Stand	$69.99
CTA122 Hutch for CT120	$49.99
CT125 Desk w/Monitor Stand	$89.99
CTA126 Hutch for CT125	$69.99

**All above items can be shipped UPS.*

PRINTERS

Canon

A40	CALL
LBP-8A1 Laser	CALL

CITIZEN

MSP-10 (80 Col.)	$279.00
MSP-15 (132 Col.)	$389.00
MSP-20 (80 Col)	$349.00
MSP-25 (132 Col.)	$509.00

C.ITOH

Prowriter 7500	$219.00
Prowriter 8510P	$299.00
Prowriter 1550P	$469.00
F10-40P Starwriter	$869.00
Prowriter 8510 -NLQ	$329.00
F10-55 Printmaster	$1049.00

EPSON

RX-100, LX-80, JX80	CALL
FX-85, FX-185, LQ1500	CALL
Homewriter 10	CALL
NEW! LX-90, SQ-2000, DX-10, DX-20, HS-80	CALL

JUKI

6000 Letter Quality	CALL
6100 Letter Quality	CALL
6200 Letter Quality	CALL
6300 Letter Quality	CALL

NEC

8027 Dot Matrix	$299.00

OKIDATA

182, 192, 193	CALL
Okimate-64	$189.00

OLYMPIA

Compact 2	$349.00
Compact RO	$289.00
Needlepoint Dot Matrix	$289.00

Panasonic.

Panasonic 1090	$199.00
Panasonic 1091	$259.00

SILVER-REED

500 Letter Quality	$279.00
550 Letter Quality	$419.00
770 Letter Quality	$759.00

star

SB/SD/SG/SR	CALL
Powertype Letter Quality	CALL
SG-10C (C64 Interface)	$NEW

TOSHIBA

1340 (80 Col.)	$589.00
P351 (132 Col.)	$1499.00

INTERFACES

DIGITAL DEVICES

U-Print C	$49.99

Orange Micro

Grappler CD Interface	$99.99

TYMAC

C64 Printer Interface	$69.99

Koala

C64 Koala Pad ROM	$59.99

JOYSTICKS

CALL FOR COMPLETE JOYSTICK SELECTION
WICO & SPRECTRAVIDIO

COMMODORE

Commodore 128 LCD CALL

C128 Computer	**$299.00**
C1571 (Disk Drive for C128)	**NEW**
C1902 (RGB 13" Monitor for C128)	**NEW**
C1670 (Modem for C128)	**NEW**
Commodore 64	$139.00
CBM 4 Plus	$199.00
M-801 Dot Matrix Parallel	$169.00
MCS 803 Dot Matrix	$179.00
1520 Color Printer/Plotter	$129.00
1530 Datasette	$39.99
1541 Disk Drive	$199.00
1660 Auto Modem	$59.99
1802 Color Monitor	$189.00
DPS Daisywheel Printer	$339.00
Desk Organizer Lock	$49.99

MSD

SD 1 Disk Drive	$219.00
SD 2 Disk Drive	$469.00

INDUS

GT-C64 Drive	$219.00

cardco, inc.

Par/Ser Interface	$65.99
5 Slot Expansion Interface	$69.99
Cassette Interface	$29.99
Cassette Deck	$29.99
G. Wiz	$59.99
S' More Basic cart. (ROM)	$49.99
32K Printer Buffer	$65.99

MONITORS

AMDEK

300 Green	$129.00
300 Amber	$139.00
Color 300 Composite	$179.00

NAP

Composite	CALL

NEC

JB 1260	$59.99
JB 1201/1205	(ea.) $99.99

TAXAN

100 12" Green	$99.99
105 12" Amber	$99.99

ZENITH

ZVM 1220 Amber	$99.99
ZVM 1230 Green	$99.99
ZVM130 Color	$269.00
ZVM131 Color	$249.00

MODEMS

ANCHOR

Signalman Express	$299.00
Lightning 2400 Baud	$399.00
Volksmodem	$59.99

TELE-LEARNING

C64 300 Baud	$39.99

TOLL-FREE 1-800-233-8950

MUST LIQUIDATE At Far Below Dealer Cost!
TOTAL Personal Computer System

Factory Reconditioned with Factory Warranty!

Carries easily as a suitcase! Plugs into 115V outlet!

GREAT GIFT IDEA FOR STUDENTS!

Sorry, we're not permitted to PRINT the famous brand-name. BUT, we CAN "tell all" if you call us TOLL FREE: 1-800-328-0609!

THE COMPUTER

Snap-on computer keyboard! 64K RAM, 20K ROM. Full-size typewriter keyboard. Upper and lower case letters, numerals, symbols, reverse characters. 2 cursor control keys, 4 function keys, programmable to 8. Music synthesizer with 3 independent voices, each with 9 octave range. Input/output ports accommodate . . . user, serial, ROM cartridge, joysticks, external monitor, phone modem.

Built-in disk drive! Intelligent high speed unit with 5¼" floppy disk recorder. 170K formatted data storage; 35 tracks. 16K ROM. Uses single sided, single density disk. Serial interface. Second serial port to chain second drive or printer.

Built-in color monitor! Displays 40 columns x 25 lines of text on 5" screen. High resolution. 320 x 200 pixels. 16 background, character colors.

Built-in ROM cartridge port! Insert ROM program cartridge. Multitude of subjects available in stores across the nation!

Original List Price $995.00

Liquidation Priced At Only $388

Item H-839-63631-00 Ship, handling: $20.00

THE PRINTER

Print method: Bi-directional impact dot matrix.
Character matrix: 6 x 7 dot matrix.
Characters: Upper and lower case letters, numerals and symbols. All PET graphic characters.
Graphics: 7 vertical dots — maximum 480 columns. Dot addressable.
Character codes: CBM ASCII code.
Print speed: 60 characters per second.
Maximum columns: 80 columns.
Character spacing: 10 characters per inch.
Line feed spacing: 6 lines per inch in character mode or 8 lines per inch selectable. 9 lines per inch in graphics mode.
Line feed speed: 5 lines per second in character mode. 7.5 lines per second in graphics mode.
Paper feed: Friction feed.
Paper width: 4.5" to 8.5" width.
Multiple copies: Original plus maximum of two copies.
Dimensions: 13"W x 8"D x 3¼"H. Wt.: 6½ lbs. **Power:** 120V AC, 60 Hz.

Original List Price: $200.00

Liquidation Priced At $118

Item H-839-63681-00 Ship, handling: $7.00

THE SOFTWARE

"Easy Script" One of the most powerful word processors at any price! Cut re-typing, create documents from standard paragraphs, do personalized letters, see and change a document before it is printed. Instruction manual has extensive training section that simplifies use . . . even for someone who has never used a computer or word processor before!

"The Manager" A sophisticated database manager for business or home use. Business uses: accounts payable/receivable, inventory, appointments, task manager. Home uses: mailing lists, home inventory, recipes, collection organizer, investment tracking, checkbook balancing. School uses: research article index, gradebook.

Original List Price: $73.98

Liquidation Price $24

Item H-839-64011-03 Ship, handling: $3.00

BUY INDIVIDUAL UNITS OR GET THIS ULTRA-FAMOUS SYSTEM AT ONE LOW PACKAGE PRICE!

TOTAL Personal Computer System available at FAR BELOW dealer cost!

Original List Price $1,293.00

TOTAL PACKAGE PRICE $488

Item H-839-64011-02 Ship, handling: $24.00

Compatible with above Computer System (Not included in package price.)

JOYSTICKS (Set of 2)
Mfr. List: $59.90 pr.
Liquidation Price . . . . . $18 pr.
Item H-839-63622-01 S/H: $6.00 pr.

64 MODEM
Mfr. List: $124.95
Liquidation Price $19
Item H-839-63646-01 S/H: $4.00

VISA MasterCard

Credit card members can order by phone, 24 hours a day, 7 days a week.

Toll-Free: 1-800-328-0609

TeleCheck Your check is welcome! No delays when you pay by check!

C.O.M.B. CO.®
Authorized Liquidator
14605 28TH AVENUE NORTH
MINNEAPOLIS, MINNESOTA 55441-3397

SEND ME THE ITEMS I HAVE LISTED BELOW
Price subject to change after 60 days. Sales outside continental U.S. are subject to special conditions. Please call or write to inquire.

Item No.	#	Item	Price	S/H
		TOTAL		

C.O.M.B. CO.® Item H-839
14605 28th Ave. N./Minneapolis, MN 55441-3397

Send the items indicated at left. (Minnesota residents add 6% sales tax. Please allow 3-4 weeks delivery. Sorry, no C.O.D.)
☐ My check or money order is enclosed. (No delays in processing orders paid by check, thanks to TeleCheck.)
Charge: ☐ MasterCard ☐ VISA
Acct. No. _____ Exp. _____
PLEASE PRINT CLEARLY
Name _____
Address _____
City _____
State _____ ZIP _____
Phone _____
Sign here _____

ATTENTION

ALL COMMODORE 64, VIC 20, COMMODORE 16, AND PET OWNERS

A complete self-tutoring BASIC programming course is now available. This course starts with turning your computer on, to programming just about anything you want! This course is currently used in both High School and Adult Evening Education classes and has also formed the basis of teacher literacy programs. Written by a teacher, who after having taught the course several times, has put together one of the finest programming courses available today. This complete 14 lesson course of over 230 pages is now available for the COMMODORE 64, VIC 20, COMMODORE 16 and PET computers and takes you step by step through a discovery approach to programming and you can do it all in your leisure time! The lessons are filled with examples and easy to understand explanations as well as many programs for you to make up. At the end of each lesson is a test of the information presented. Furthermore, ALL answers are supplied to all the questions and programs, including the answers to the tests. Follow this course step by step, lesson by lesson, and turn yourself into a real programmer! You won't be disappointed!

We will send this COMPLETE course to you at once for just $19.95 plus $3.00 for shipping and handling (U.S. residents, please pay in U.S. funds). If you are not COMPLETELY satisfied, then simply return the course within 10 days of receipt for a FULL refund.

Fill in the coupon or send a facsimile.

CG

NAME:_____

ADDRESS:_____

CITY:_____

PROV./STATE:_____

POSTAL/ZIP CODE:_____

Check desired course: **COMMODORE 64** ☐ **VIC** ☐ **PET** ☐ **COMMODORE 16** ☐

Send Cheque or Money Order to:
Brantford Educational Services
6 Pioneer Place,
Brantford, Ontario,
Canada N3R 7G7

Complete course: $19.95
Postage and hand.: $3.00
Total: $22.95

Confused by Mail Order Ads???

Price is not the only concern. You should ask . . .

1. Do you have the advertised product in stock?
2. If the product is defective who handles the warranty?
3. What is the total price delivered to my door?

For the straight answers to these and all your questions, call us!

Send A Stamped, Self-Addressed Business Envelope for A Complete Product Listing!!! C-64 Hardware Still Available, CALL!

C-128 HARDWARE

1700 . . . . . **128K Expander** **1571 Drive** . . . **350K DS/DD**
1750 . . . . . **384K Expander** **1670** Auto Modem . **1200 Baud**
1902 Color Monitor 13" RGB/Composite . **80/40 Column Display**
Teknika MJ22 Same Specs as 1902 . . . . . **$289**
1350 Mouse . . . . . Eases Computer Input

C-128 SOFTWARE

JANE . . . . . Integrated Software for use with 1350
Perfect Calc/Writer/Filer, . . . Powerful CP/M Business Software

PRINTERS

STAR SG10 CALL!
2K Buffer
NLQ Mode

We stock a complete selection of ribbons

Powertype Daisywheel 18 CPS with Xetec **$354**
Okidata 182 . . . . . **Call**
Riteman C+ . . . . . **Call**
Xetec Super Graphics NEW, 8K Buffer, NLQ Mode, Downloadable Fonts, A BEST BUY . . . . . **Call**
MW-350 Interface . . . . **Call**

MONITORS

Comrex 12" Amber . . . **$75** **Teknika MJ10** **$189**

MODEMS

Master Modem by Video 7 NEW, 300 Baud, Auto Dial/Answer Up/Download Software, CompuServe Sample, American Made Best Buy **$49**
Commodore 1660 . . . . **$59**
VIP Terminal . . . . . **Call**
CompuServe Starter Kit & Vidtex . . . Both for **39.95**

ACCESSORIES

Com Cool/Plus . . . . **$49/69** **Power Pak** **$27**
Disk Head Cleaner . . . . . **12** **Surge Protector** 4-Plug . . . **25**
• *SPECIAL* • **Xidex Diskettes SS/DD $10.95** • *SPECIAL* •

NAUGAHYDE COVERS by AMERICAN COVER

Commodore C-128 or 1571 Drive . . . . . each **$ 8**
C-64 or 1541 Drive . . . ea. **$6** **1702 Monitor** **11**
MSD Drives 1/2 . . . . . **6/7** **1525/MPS 801** **8**
Gemini 10X & SG-10 . . . . **9** **1526/MPS 802** **9**

DATABASE MANAGERS

The Consultant . . . . . **$59** **Vizastar** **89**
Super Base 64 . . . . . **49**

WORD PROCESSORS

Paper Clip/& speller **$55/69** **Easy Script/Spell** . . . **$35/17**
Fleet System 2 . . . . . **Call** **Paperback Writer** **37**

MOST ORDERS SHIPPED WITHIN 48 HOURS! Advertised prices are for bank check or money order. VISA/MC orders add 3.5%. NO C.O.D ORDERS. Personal or company checks delay orders 21 days. All sales are final – defective merchandise exchanged for same product only. Call for return authorization number. All returned products are subject to a restocking fee unless they are defective and returned for exact exchange. In the continental U.S. add 3% for shipping ($2.50 min.) Please call for shipping on monitors. Ohio residents add 5.5% sales tax. Prices & availability subject to change.

HOURS: MONDAY-FRIDAY 10 AM to 10 PM • SATURDAY 10 AM to 5 PM

ORDER LINE: 800-638-2617 AUTHORIZED COMMODORE REPAIR CENTER
INFORMATION & IN OHIO 216/758-0009

BIG BYTES

1301 BOARDMAN-POLAND ROAD POLAND, OHIO 44514

Software Discounters of America

For Orders Only—1-800-225-7638
PA Orders—1-800-223-7784
Customer Service 412-361-5291

Open Saturday

- Free shipping on orders over $100 in continental USA
- No surcharge for VISA/MasterCard
- Your card is not charged until we ship

ACCESS
Beach Head (D) $21
Beach Head 2 (D) $25
Mach 5 (R) $23
Raid Over Moscow (D) $25
ACTIVISION
Alcazar: The Forgotten Fortress (D) $21
Alter Ego (D) $21
Countdown to Shutdown (D) $21
Decathalon (D) $19
Fast Tracks: Slot Car Const. Kit (D) $21
Fireworks Celebration Kit (D) $23
Garry Kitchen's Gamemaker (D) $21
Ghostbusters (D) $21
Great American Cross-Country Road Race (D) $21
Hacker (D) $21
Master of Lamps (D) $19
Mindshadow (D) $19
Music Studio (D) $19
Pet Person (D) $21
Rock 'N Bolt (D) $19
Space Shuttle (D) $19
AMERICAN EDUCATIONAL
Biology (D) $16
Grammar (D) $16
Science: Grades 3/4(D) $16
Science: Grades 5/6(D) $16
Science: Grades 7/8(D) $16
U.S. Geography (D) $16
World Geography (D) $16
ARTWORX
Bridge 4.0 (D) $16
Flight Path 737(D) $16
French (D) $19
International Hockey (D) $19
Spanish (D) $19
Strip Poker (D) $21
Data Disk #1 female $16
Data Disk #2 male $16
Data Disk #3 female $16
ARTWORX PX
Baker St. Detective (D) $7
Cavefighter (D) $7
Galaxy (D) $7
Jumpin' Jimmy (D) $7
Pro Boxing (D) $7
Starbase Defense (D) $7
Zodiac (D) $7
AVALON HILL
Black Thunder (D) $16
Gryphon (D) $16
Jupiter Mission 1999(D) $23
Maxwell Manor (D) $19
Panzer Jagd (D) $21
Parthian Kings (D) $19
Ripper (D) $19
Super Bowl Sunday (D) $21
T.A.C. (D) $26
Telenguard (D) $19
Tournament Golf (D) $21
BRODERBUND
Bank St. Filer (D) $33
Bank St. Mailer (D) $33
Bank St. Writer (D) $33
Bank St. Speller (D) $33
Castles Dr. Creep (D) $19
Champ Loderunner(D) $23
Karateka (D) $19
Music Shop (D) $29
Print Shop (D) $29
P.S. Graphics Library #1 (D) $17
P.S. Graphics Library #2 (D) $17
P.S. Graphics Library #3 (D) $17
Spelunker (D) $19
Stealth (D) $19
Whistler's Brother (D) $19
CBS
Astro Grover (D) $19
Big Bird's Funhouse(D) $19
Dinosaur Dig (D) $25
Dr. Seuss: Fix-Up the Mix-Up Puzzler (D) $19
Mastering the SAT (D) $49
Mr. Rogers: Many Ways to Say I Love You (D) $19
Success w/Algebra Call
Success w/Math Call
CARDCO
G-wiz Call
S'more (R) $47
Write Now (R) $33
CONTINENTAL
Book of Adv. Games $14
Home Accountant (D) $44
CREATIVE
Easy Disk (D) $21
I am the C64 (D) $19
Roll Call USA (D) $12
Trolls & Tribulations (D) $19
DATAMOST
Aztec (D) $17
Kwik-Calc (D) $14
Kwik-File (D) $14
Mychess II (D) $21
DATASOFT
Alternate Reality (D) $26
Bruce Lee (D) $19
Conan (D) $19
Elevator Action (D) $19
Mr. Do (D) $16
Pole Position 2 (D) $19
The Goonies (D) $19
Zorro (D) $19
DAVIDSON
Math Blaster (D) $33
Speed Reader 2 (D) $43
Spell It (D) $33
Word Attack (D) $33
DESIGNWARE
All Titles Available Call
ELECTRONIC ARTS
Adv. Const. Set (D)
Archon (D)
Archon 2: Adept (D)
Carriers at War (D)
Europe Ablaze (D)
Heart of Africa (D)
Mail Order Monsters (D)
Movie Maker (D)
Music Const. Set (D)
One-on-One (D)
Pinball Const. Set (D)
Racing Dest. Set (D)
Reach for Stars (D)
Seven Cities of Gold (D)
Skyfox (D)
Prices too low to advertise!! **Call**
EPYX
Ballblazer (D) $25
Barbie (D) $19
Chipwits (D) $19
Fast Load (R) $25
GI Joe (D) $19
Hot Wheels (D) $19
Impossible Mission(D) $21
Jet Combat Simulator (D) $19
Koronis Rift (D) $26
Rescue on Fractalus (D) $25
Robots of Dawn (D) $19
Summer Games 2 (D) $25
Temple of Apshai Trilogy (D) $25
The Eidolon (D) $26
Winter Games (D) $25
World's Greatest Baseball (D) $21
World's Greatest Football (D) $25
FIRST STAR
Spy vs. Spy (D) $19
FISHER PRICE
All Titles Available Call
First Men in the Moon Math (D) Call
Movie Creator (D) Call
Peter & The Wolf Music (D) Call
Peter Rabbit Reading (D) Call
GAMESTAR
On-Court Tennis (D) $19
On-Field Football (D) $19
On-Track Racing (D) $17
Star-League Baseball (D) $19
Star Rank Boxing (D) $19
HAYDEN
Sargon II (D) $16
Sargon III (D) $33
HBJ
SAT (D) $47
HES
Cell Defense (D) $12
Factory (D) $12
Hes Mon $21
Millionaire (D) $19
Omniwriter w/Spell (D) $33
Project Space Station (D) $19
Super Zaxxon (D) $12
Tri-Math (D) $12
INFOCOM
Cut Throats (D) $23
Enchanter (D) $23
Hitchhiker's Guide to the Galaxy (D) $23
Infidel (D) $26
Invisiclues Call
Planetfall (D) $23
Sorcerer (D) $26
Wishbringer (D) $23
Zork 1 (D) $23
Zork 2 or 3 (D) $26
KOALA
Muppet Learning Keys (D) $39.95
Touch Tablet w/Painter(D) $39.95
Koala Printer (D) $19
LEARNING COMPANY
All Titles Available Call
MICROLEAGUE
Baseball (D) $26
General Manager (D) $26
1984 Team Data Disk $16
MICROPROSE
Acro Jet: Advanced Flight Simulator(D) $23
Crusade in Europe (D) $26
Decision in the Desert (D) $26
F-15 Strike Eagle (D) $21
Gun Ship: The Helicopter Simulation (D) Call
Kennedy Approach(D) $21
Mig Alley Ace (D) $23
Nato Commander (D) $23
Silent Service: The Submarine Simulation (D) $23
Viet Nam Conflict (D) Call
MINDSCAPE
Bank St. Music Writer (D) $26
Bank St. Storybook (D) $26
Color Me: The Computer Coloring Kit (D) $19
Color Me Picture Disks:
Hugga Bunch $7
Rainbow Brite $7
Shirt Tales $7
Tink! Tonk! $7
Crossword Magic (D) Call
Halley Project (D) $26
Indiana Jones (D) $19
Mr. Pixel's Cartoon Kit (D) $21
Mr. Pixel's Game Maker (D) $21
Perfect Score SAT (D) $49
Show Director (D) $19
MISC
Bounty Bob Strikes Back (D) $23
Buckaroo Banzai (D) $21
CSM 1541 Alignment Kit (D) $29
Central Point-Copy II (D) $23
Commodore 64 Software Book (1985) $14
Diskey (D) $33
Fantastic Four (D) $21
1541 User's Guide (Book) $16
Inside Commodore DOS (Book) $16
Karate Champ (D) $26
Maxi Golf (D) $21
Miner 2049er (R) Cheap
Multiplan (D) Call
Sorcerer of Claymorgue Castle (D) $21
Sundex CPA (D) $47
Superbase 64 (D) $47
VIP Terminal XL (D) Call
ORIGIN
Ultima III (D) $39
Ultima IV (D) Call
PROFESSIONAL SOFTWARE
Fleet System 2—W.P. w/70,000 word spell checker (D) $47
Trivia Fever (D) $21
Trivia Fever Vol. 2(D) $19
Super Sports Trivia (D) $19
RANDOM HOUSE
Alpine Encounter (D) $21
Charlie Brown's ABC's (D) $19
Charlie Brown's 1,2,3's (D) $19
Snoopy's Reading Machine (D) $19
Typing Is A Ball, Charlie Brown (D) $19
SCARBOROUGH
Boston Computer Diet (D) $49
Build A Book (D) $19
Build A Book Refills Call
Mastertype (D) $23
Net Worth (D) $44
SIERRA
Donald Duck's Playground (D) $17
Homeword (D) $33
Mickey's Space Adventure (D) $17
Stunt Flyer (D) $19
Ultima 2 (D) $39
Winnie the Pooh (D) $17
SIMON & SCHUSTER
Dell's Xword Puzzles Vol. 1 or 2 (D) $16
Gonzo in Wordwrider (D) $19
Kermit's Electronic Storymaker (D) $19
Lovejoy's SAT (D) $49
NY Times Crossword Puzzles Vol. 1 or 2 (D) $16
Spy Hunter (R) $29
Star Trek-The Kobiashi Alternative (D) $26
Typing Tutor III (D) $26
SPINNAKER
Adventure Creator (R) $19
Aerobics (D) $23
Alphabet Zoo (R) $19
Counting Parade (D) $17
Facemaker (R) $17
Fraction Fever (R) $17
Homework Helper-Math Word Problems (D) $23
Homework Helper-Writing (D) $23
Kids on Keys (R) $19
Kidwriter (D) $19
Kindercomp (R) $19
Math Busters (D) $17
Snooper Troops 1 or 2 (D) $19
Story Machine (R) $17
Trains (D) $19
*Buy 3 titles & receive 1 free directly from Spinnaker
SPRINGBOARD
Early Games (D) $21
Easy as ABC (D) $23
Fraction Factory (D) $19
Newsroom (D) Call
Stickers (D) $23
SSI
Baltic 1985 (D) $23
Battalion Commander(D) $26
Breakthrough in the Ardennes (D) $39
Broadsides (D) $25
Colonial Conquest (D) $25
Combat Leader (D) $25
Computer Ambush (D) $39
Computer QB (D) $25
Cosmic Balance (D) $25
Field of Fire (D) $25
Fifty Mission Crush (D) $25
Gemstone Warrior (D) $23
Germany 1985 (D) $39
Imperium Galactum(D) $25
Kampfgruppe (D) $39
Mech Brigade (D) $39
Norway 1985 (D) $23
Phantasie (D) $25
Pro Tour Golf (D) $26
Questron (D) $25
Ringside Seat (D) $25
Six-Gun Shootout (D) $25
Wings of War (D) $26
SUBLOGIC
Flight Simulator II (D) $32
Flight Simulator Scenery Disks (D) Call
SYNAPSE
Blue Max 2001 (D) $19
Brimstone (D) $26
Essex (D) $26
Lode Runner's Rescue (D) $19
Mindwheel (D) $26
Syn-Calc (D) $33
TELARIUM
Amazon (D) $21
Dragonworld (D) $21
Fahrenheit 451 (D) $21
Nine Princes in Amber (D) $21
Perry Mason: Case of the Mandarin Murder (D) $21
Rendezvous w/Rama (D) $21
TIMEWORKS
Accts. Payable (D) $39
Accts. Receivable (D) $39
Data Manager 2 (D) $33
Electronic Checkbook (D) $16
Evelyn Wood Dynamic Reader (D) $33
General Ledger (D) $39
Inventory Mgmt (D) $39
Money Manager (D) $16
Payroll Mgmt (D) $39
Sideways (D) $19
Swiftcalc/Sideways (D) $33
Sylvia Porter's Personal Financial Planner(D) $39
Word Writer w/ Speller (D) $33
TRONIX
S.A.M. (D) $39
WEEKLY READER
Stickybear ABC'S (D) $19
Stickybear Math (D) $19
Stickybear Numbers(D) $19
Stickybear Opposites (D) $19
Stickybear Reading (D) $19
Stickybear Shapes (D) $19
WINDHAM CLASSICS
Alice in Wonderland(D) $17
Below the Root (D) $17
Swiss Family Robinson (D) $17
Treasure Island (D) $17
Wizard of Oz (D) $17
ACCESSORIES
Bonus SS. DD Cheap
Compuserve Starter Kit (5 hrs) $19
Compuserve Vidtex (D) $19
Datashare Printer Int. w/ Graphics $39.95
Disk Case (Holds 50) $9
Disk Drive Cleaner $9
Dow Jones News Retrieval Kit (5 hrs) $16
Kraft Switch Hitter Joystick Call
Sakata 13" Color Composite Monitor for C64 $169
Surge Protector w/6 outlets $35
Total Auto Answer/ Auto Dial Modem w/Software $29.95
Wico Bat Handle $19
Wico Boss $12
Wico Trackball $33

Extended Holiday Hours
Nov. 11-Dec. 16
M-Th
8:30 AM-9 PM EST
Fri-Sat
8:30 AM-6 PM EST
Christmas Order Deadline Dec. 17

P.O. BOX 278—DEPT. CG—WILDWOOD, PA 15091

***Ordering and Terms:** Orders with cashier check or money order shipped immediately. Personal/company checks, allow 3 weeks clearance. No C.O.D.'s. **Shipping: Continental U.S.A.**—Orders under $100 add $3. **free shipping on orders over $100.** PA residents add 6% sales tax. **AK, HI, FPO-APO**—add $5 on all orders. Sorry—no International orders. Defective merchandise will be replaced with same merchandise. Other returns subject to a 15% restocking charge—NO CREDITS! Return must have authorization number (412) 361-5291. Prices subject to change without notice.

WHITE HOUSE COMPUTER

P.O. Box 4025, Williamsport, PA 17701

"Where Prices Are Born, Not Raised"

TOLL FREE 1-800-351-3442

PA CALL 1-717-322-7700

— PA Residents FREE Shipping —

MON - FRI 9 AM - 6 PM VISA and MC Accepted 4%

POLICY: No deposit on COD orders. Free freight on all prepaid cash orders over $300 in the continental USA. APO & FPO add $5.00 per hundred. For priority mail add $8.00 per hundred. PA residents add 6% sales tax. Defective products must have Prior RA number. Schools net 15.

PRINTERS

EPSON		**COMMODORE**	
RX 80	209.00	MPS 801	125.00
RX 100	369.00	802	199.95
JX 80	479.00	803	165.95
FX 85	345.00	DPS 1101	295.95
FX 185	499.00		
LQ 1500 (PAR)	979.00	**STAR MICRONICS**	
LQ 1500 (SER)	1039.00	**SG 10**	**214.00**
LX 80	222.00	SG 15	379.00
Homewriter	209.00	SD 10	321.95
Comrex 220 Atari	199.00	SD 15	450.00
Comrex 220 Comm.	199.00	SR 10	485.00
LX 90	245.00	SR 15	585.00
SQ 2000	1525.00	Powertype	307.00
DX 10 Daisywheel	235.00		
DX 20 Daisywheel	319.00	**LEGEND**	
HS 80 Letter Jet	359.00	**1380**	**269.00**
CITIZEN		**1385**	**305.00**
MSP 10	275.00	1080	229.00
MSP 15	450.00	808	159.95
MSP 20	450.00		
MSP 25	575.00		
OKIDATA		**PANASONIC**	
Okimate 10	179.95	1090	187.00
182	**219.95**	**1091**	**CALL**
84	640.95	1092	385.00
192	**349.95**	1093	425.00
193	525.95	3151	455.00

COMPUTERS

C-64	149.95
C-128	275.95

INTERFACES

Cardco G	39.95
G-Wiz	48.95
Grappler CD	89.00
Tymac Connection	58.95

PRINTER PAPER

2500 Shts Lazor	**24.95**
1000 Shts Lazor	14.95
500 Shts Lazor	9.95
COLOR PAPER ASSORTED COLORS	
2500 Shts Lazor	42.95
1000 Shts Lazor	23.95
500 Shts Lazor	9.95

DISK DRIVES

Indus GT	229.00
MSD Dual	459.00
Enhancer 2000	189.95
1541	195.00
1571	249.95
1572	375.95

MONITORS

AMDEK	
300 G	119.00
300 A	129.00
Color 300	185.95
Color 500	339.00
Color 600	399.00
Color 700	469.00
Color 710	539.00
310 A	145.00
XTRON	
Comcolor I	189.00
COMMODORE	
1702	189.95
1902	259.95
TEKNIKA	
MJ 10 Comp/ Sep. Video	185.95
MJ 22 RGB/Comp Sep. Video	269.95
ZENITH	
ZVM 122 Amber	82.95
ZVM 123 Green	75.95
ZVM 131 RGB Color/Green	229.00
ZVM 133 RGB Color/Green	389.00
ZVM 130 Color/ Green	259.00
ZVM 135 RGB Color/Green	439.00
NEC	
1260	139.95
1205	95.00
1201	139.95
SAKATA	
SC 100	179.00

DISKETTES

SKC Lifetime Warranty	
SS/DD	10.95
DS/DD	14.95
Bonus Lifetime Warranty	
SS/DD	9.50
DS/DD	13.50
MAXELL	
MD 1	15.95
MD 2	20.95

MODEMS

C-64 1064	54.95
Tele Learning	39.95
Westridge	59.95
Mitey Mo	59.95
Volks 300	59.95
Volks 300/1200	179.95
Hayes 300	149.95
Hayes 1200	385.95
C-1670	185.95
C-1660	54.95
Compuserve	19.85
INNOVATIVE CONCEPTS	
Flip-N-File 10	2.50
Flip-N-File 15	6.50
Flip-N-File 25/Lock	12.50
Flip-N-File 50	12.50
Flip-N-File 50/Lock	16.50

SOFTWARE

Print Shop	28.95
Graphics Library 1	17.50
Graphics Library 2	17.50
Music Shop	34.95
Bank Street Writer	39.95
Syn Calc	32.95
Syn File	32.95
Relax	79.95
Body Sensors	34.95
Paperclip	55.95
Paperclip/Spell	61.95
Homepack	31.95
Consultant	59.95
B.I. 80 Column Card	99.95
Bus Card II	119.95
Fast Load	23.95
WICO	
Bat Handle	17.95
Boss	13.95
3-Way	21.95

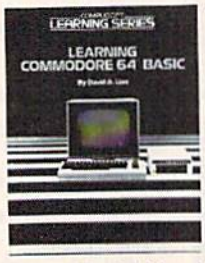
SYMPHONIC VHS VCR/REMOTE

★14 Day/1 Program Timer
★105 Channel Cable Ready
★12 Pre-set channels
★Auto Rewind **$275.00**

LEARNING COMMODORE 64® BASIC

The perfect gift for any Commodore 64 user!

(Or for yourself)



BASIC programming is easy to learn with David Lien's 380 page hands-on tutorial. It's understandable! It's comprehensive! And it makes learning fun!

Programming puts you in command of your computer. And author David Lien is no stranger to BASIC programming, to computers or to teaching. His CompuSoft Learning Series tutorials alone have sold over a million copies providing readers the easy-to-understand instructions that you expect and deserve.

Order NOW for holiday delivery — Call **TOLL FREE 800-854-6505** — in Calif. 619-588-0996. Or send $14.95 (add 6% sales tax for California addresses) plus $2.00 ($3.00 foreign) for postage and handling. Visa and MasterCard users, include card # and expiration date. Mail to:

CompuSoft® Publishing
535 Broadway, Dept. 281285
El Cajon, CA 92021

All programs listed in this magazine are available on the GAZETTE Disk. See elsewhere in this issue for details.

Aquarian Software Introduces . . .
Powerful Programs at Affordable Prices

Mike J. Henry's

FAST BOOT!

- Works with **Both** 1541 and MSD Drives!
- Multiple loading options for increased compatibility.
- Disk-Based & Non-Protected

Only $14.95

Modem Master

The Fastest Commodore BBS Available!

- Works with 1541 or MSD Dual Drive
- 300/1200 Baud Operation
- New Punter File Transfer Protocol
- Fully Menu Driven
- Over 25 Commands
- Public Message Base
- Private E-Mail Base
- E-Mail Check at Sign-On
- Sub-Directories for File Transfer
- 250 User Capacity
- Accurate Clock/Calendar
- Printer Output
- Information Files
- "Old" E-Mail Deleted After One Week
- User Survey/Poll
- Set Up in Only 10 Minutes!

Only $29.95

Graphic Screen Exporter 64

NEW!

- A Universal Graphic Converter
- Converts Anything to Anything — Including:
  Koala Pad, Flexidraw, Doodle, Print Shop
  And Many More!
- Complete On-Screen Editor

The Most Versatile Graphics Utility Ever Released for the Commodore 64 !

Only $29.95

The Cataloger

The Ultimate Disk Cataloging System for the 64!

Features of The Cataloger V3.5A Include:

- ★ Easy loading of information. Loads directly from the disk itself.
- ★ Ability to change name of entry.
- ★ Ability to change any information instantly — uses relative files exclusively.
- ★ Search, Sort and Print by any of 12 fields.
- ★ Capacity for 1100 different programs (or disks) per data disk.
- ★ FAST — all machine language.
- ★ Menu driven — very easy to use.
- ★ Works with ALL printers.
- ★ Works with one or two drives.
- ★ Allows duplicate ID's.
- ★ Allows selection of items to be entered.

Only $24.95

TURBO CALC/64

A Great Beginner's Spreadsheet At an UNBELIEVABLE Price!!

- 100% Memory Resident
- 100% Machine Code and P-Code
- 100% Menu Driven
- Over 13 K RAM for Data
- Large Matrix, 100 Rows by 26 Columns
- On-Line Help Screens
- On-Screen Menu at All Times
- Full Printer Support
- Built-in Functions (SUM, AVG, MIN, MAX)

At last, a powerful, yet affordable spreadsheet!

ONLY $17.95

I.E.A.
Instant Editor Assembler
for the Commodore 64

- ★ Written 100% in machine language
- ★ Assembles 17K source code in 5 seconds!
- ★ Co-resident editor assembler monitor
- ★ Compatible with HES MON
- ★ Slow-motion code analyzer
- ★ Technical assistance number

"I would have to recommend the IEA Instant Editor Assembler, the BEST VALUE-FOR-PRICE development package on the market!"
Jim Gracely,
Technical Editor
Commodore Microcomputer Magazine

"IEA is a nice, simple assembler, good for beginners at an UNBELIEVABLE PRICE!"
Jim Butterfield

Now Only $17.95

Nova Decoder 64
Version 3.0

A 6502/6510 Disassembler Designed for the Commodore User

A MUST for anyone just learning Machine Language.
A TREAT for those examining the operation of the C-64.
A BLESSING to machine language programmers trying to de-bug their programs.

- ★ Choose Screen or Printer Options
- ★ Addresses Printed in Either Hex or Decimal
- ★ Complete Calculations of Branch Commands
- ★ Brief Explanations of Each Command Encountered
- ★ Generates Tables of Zero Page Addresses Used, Branch Addresses, All Jump Routines, and More . . .

Only $19.95

Disk-Lock V2.1

At Last! A professional copy protection system is available to YOU. Now you can protect your programs from most copy programs!

- Disk-Lock is Designed to Prevent Full Disk Copies.
- Stops Over 90% of All Copiers
- Offers Multiple Protection Schemes
- Place Protection on Any Track From 1 to 40!
- Fully Menu Driven

Only $39.95

Canadian Best-Sellers NOW Available in the U.S.

The Gold Disk Series

Quality Software for Your 64 at an Affordable Price!

Only $14.95 Per Disk*

* Plus Shipping and Handling

Each Disk Contains:

- The Feature Program
- A Home Business Program
- Two High-Quality Games
- Tutorials on Programming
- And MUCH MORE !!

Volume 10 Now Available — Featuring an Advanced Sound Synthesizer

Volumes 1 through 9 Are Also Available

Dealers Welcome ! — Call (503) 654-2641 For Details.

The Complete Thriller Collection

All six thrilling adventures now together on one disk! Plus — as a bonus — **Three Hours To Live!** Each is a full-length machine language text adventures that will take you weeks to complete. They feature full-sentence input (not just two words!) with color and sound.

Includes:

- Night of the Walking Dead
- Perils of Darkest Africa
- Revenge of The Moon Goddess
- Son of Ali Baba
- Frankenstein's Legacy
- Shipwrecked!
- Plus Three Hours to Live

Only $24.95
For All SEVEN !

Aquarian Software
P.O. Box 22184
Portland, OR 97222

To Order, Call: (503) 654-2641
VISA and MasterCard Accepted

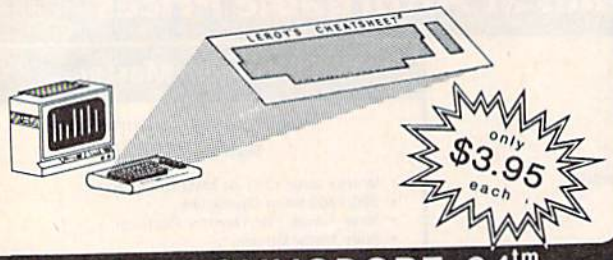
VISA MasterCard

Dealer Inquiries Welcome!

Add $3.00 S & H Per Order
Add $5.00 for COD
Canadian Orders: Add $10.00 S & H-U.S. Funds Only, Please.
Allow 4 to 5 weeks for delivery.

LEROY'S CHEATSHEET®

KEYBOARD OVERLAYS



FOR COMMODORE 64™

(VIC-20 also available)

LEROY'S CHEATSHEETS® are plastic laminated keyboard overlays designed for use with popular software and hardware for Commodore's VIC-20 & C-64 computers.

These cut-it-out yourself overlays are designed to fit over the keyboard surrounding the keys with commands and controls grouped together for easy references.

LEROY'S CHEATSHEETS®

make life easier for you

WORD PROCESSORS
- ☐ Easy Script
- ☐ HES Writer
- ☐ Paper Clip
- ☐ Quick Brown Fox
- ☐ Script 64
- ☐ Speedscript (2.0 & 3.0 GAZETTE)
- ☐ Wordpro 3/PLUS
- ☐ Omniwriter
- ☐ Wordpro 64 (By Steve Punter)
- ☐ Write Now!/64
- ☐ Fleet System 2

SPREADSHEETS
- ☐ Calc Result (advanced)
- ☐ Calc Result (easy)
- ☐ Easy Calc
- ☐ Multiplan
- ☐ PractiCalc 64
- ☐ PRACTICALC II
- ☐ VIZASTAR

NEW

DATA BASES
- ☐ The Consultant (Delphi's Oracle)
- ☐ The Manager (CBM)
- ☐ SuperBase 64

MISCELLANEOUS
- ☐ Blanks (3 each - NOT Laminated)
- ☐ For The Beginner (using the 64)
- ☐ Sprites Only
- ☐ Flight Simulator II
- ☐ Doodle
- ☐ 1541 Disk
- ☐ Sky Travel

LANGUAGES & UTILITIES
- ☐ COMAL
- ☐ SIMON'S BASIC
- ☐ Basic
- ☐ Hesmon 64
- ☐ LOGO (sheet 1)
- ☐ LOGO (sheet 2)
- ☐ Pilot (CBM)

TERMINALS
- ☐ Vidtex
- ☐ The Smart 64 Terminal
- ☐ VIP Terminal
- ☐ Term 64

PRINTERS
- ☐ Printer, (CBM) 1525, MPS 801, MPS 803
- ☐ Printer, (CBM) 1526, MPS 802
- ☐ Printer, (Epson) RX & FX 80 & 100
- ☐ Printer, (Gemini) 10X - 15X
- ☐ Printer, Okidata 92 & 93

GAZ 12

Dealer inquiries welcome

Qty.___ X $3.95 $ _____

Shipping & handling $ 1.00

6% sales tax (PA residents only) $ _____

TOTAL $ _____

U.S. FUNDS

NO COD's PLEASE

Name _____

Address _____

City _____ State _____ Zip _____

CHEATSHEET PRODUCTS INC

P.O. Box 111368 Pittsburgh PA. 15238

VISA master charge

(412) 781-1551

☐ Charge My VISA or Master Card NUMBER

EXPIRATION DATE

. . . OR SEE YOUR LOCAL DEALER !

From stocking-stuffers to gifts that'll light up their eyes, Computer Warehouse is *the* place to shop. You'll know you're getting the lowest prices: just see the list below and compare!

And even Santa couldn't get your order out faster! So call our hotline today, and wrap up your gift list at Computer Warehouse.

HARDWARE

C-128	Call
1571 Disk Drive	Call
1670 Modem	Call
1902 Monitor	Call
Amiga	Call
Commodore 64	139.00
1541 Disk Drive	164.00
1702 Monitor	169.00
803 Printers	139.00
803 Tractor Feed	29.95
Modem 300/1660	79.95
Power Packs	29.95
1101 Printer (daisy wheel)	329.00

PRINTERS

Star SG-10	224.00
SG-10C	239.00
Panasonic 1091	259.00
Axiom Elite 5 (daisy wheel)	249.00
Okidata 182	269.00
Legend 808	179.00

MONITORS

Sakata 13" Color	179.00
Zenith 13" Green	89.00
Zenith 13" Amber	99.00
USI 12" Green	79.00

MODEMS

Westridge 6420	69.95
MPP 1064	79.95
Total Telecommunications	39.95
Mighty Mo	79.95

SOFTWARE

Printshop	34.95
Graphics Library	24.95
FastLoad	29.95
Fleet System 2	69.95
Zork I, II, III	29.95
Training Kit (C-64 Tutorial)	19.95
Wordpro 3 & 64	39.95
Exodus Ultima III	39.95
Rescue on Fractolus	29.95

DISK DRIVES

Indus GT	249.95
MSD Single	289.95
MSD Dual	499.95

DISKETTES (10-PACKS)

Generic Disks DS/DD	10.00
SKC SS/SD	13.95
SKC SS/DD	15.95
Elephant SS/SD	16.95
Elephant SS/DD	19.95
Elephant DS/DD	24.95
Elephant Premium SS/DD	21.95
Maxell SS/DD	22.95
Maxell DS/DD	29.95
Bonus SS/DD (11-Pack)	12.95

ACCESSORIES

Floppiclene Head Cleaner	14.95
Numeric Keypad	34.95
Monitor Cables	9.00
6 foot I/O Cable	9.00
Paper—(1000 Sheets)	18.00
Joysticks	7.95
Surge Suppressor 6 outlet w/ 6 ft. cord Emz/Rfi filter	49.95
Diskcover 35 (Storage Box)	5.95
Printer Stand	19.95

*We also carry a full line of Covers, Printer Ribbons, Cables, Labels, Storage Cases.

*We also offer all other Commodore Compatible software. Call for new titles & prices.

COMPUTER WAREHOUSE

(In FL) 305-274-3680; 1-800-372-0214
7222 S.W. 117th Avenue,
Miami, FL 33183

Add 3% ($3 minimum) for shipping and handling charges. FPO's & APO's and overseas subject to additional shipping charges. Ad prices reflect 3% cash discount. Credit card orders should add 3%. Prices and availability subject to change without notice.

presenting . . . CAPTURE™

A NEW WAY TO UNLOCK THE POWER OF YOUR C64 OR C128*

- **CAPTURE** IS A CARTRIDGE THAT PLUGS INTO YOUR COMPUTER'S EXPANSION PORT.
- **CAPTURE** DOES NOTHING — UNTIL YOU PRESS ITS **CAPTURE** BUTTON. UNTIL THEN, A RUNNING PROGRAM CANNOT DETECT ITS PRESENCE.
- **CAPTURE** THEN TAKES CONTROL — NO IFS, ANDS OR BUTS — AND PRESENTS A MENU.
- **CAPTURE** WILL NEATLY SAVE EVERYTHING IN YOUR COMPUTER TO YOUR 1541 OR COMPATIBLE DISK DRIVE — ALL 64K OF RAM, CPU, VIC AND SID CHIP REGISTERS — EVERYTHING. IN EASY TO VIEW CHUNKS.
- **CAPTURE** WILL, IF YOU WANT, PRE-CONFIGURE YOUR COMPUTER'S RAM SO THAT ONLY MEMORY ALTERED BY YOUR PROGRAM NEED BE SAVED.
- **CAPTURE** WILL WRITE A BOOT ON YOUR DISK SO YOU CAN RELOAD AND BEGIN EXECUTION RIGHT WHERE YOU LEFT OFF.
- **CAPTURE** DOES ALL THIS AT A COST OF JUST **$39.95**

BUT HERE'S THE BEST PART

- **CAPTURE** WILL MAKE AN AUTO-START CARTRIDGE OF YOUR PROGRAM. IT'S EASY! JUST FOLLOW THE DIRECTIONS ON THE SCREEN. NOW PLUG IN YOUR CARTRIDGE AND TURN ON YOUR COMPUTER. IN LESS THAN TWO SECONDS YOUR PROGRAM BEGINS AGAIN AT PRECISELY THE POINT WHERE YOU **CAPTURE**'D IT. MAGIC!

  BESIDES **CAPTURE,** YOU NEED A *promenade* C1 AND A SUPPLY OF CPR3 CARTRIDGE KITS.

ORDERING INFORMATION

- **CAPTURE** CARTRIDGE — COMPLETE WITH INSTRUCTIONS ..... $ 39.95
- *promenade* C1 — EPROM PROGRAMMER WITH DISK SOFTWARE 99.50
- CPR3 CARTRIDGE KIT — PC BOARD, CASE AND 3 EPROMS 29.95
- DR—EPROM ERASER, TWO AT A TIME, 3 TO 10 MINUTES 34.95
- STARTER SET — **CAPTURE,** *promenade* C1 AND 1 CPR3 ..... 149.95
- DELUXE SET — **CAPTURE,** *promenade* C1, DR AND 2 CPR's 199.95

SHIPPING AND HANDLING — USA: UPS SURFACE $3.00
BLUE LABEL $5.00 NEXT DAY AIR $13.00
CANADA: AIR MAIL $7.00 OTHER FOREIGN AIR $12.00

CALIFORNIA RESIDENTS ADD APPLICABLE SALES TAX
COD ORDERS, USA ONLY, ADD $3.00

C64 AND C128 TM COMMODORE ELECTRONICS, LTD. *WHEN OPERATING IN 64 MODE

TO ORDER: TOLL FREE 800-421-7731
FROM CALIFORNIA 800-421-7748

TECHNICAL SUPPORT AND 408-287-0259
FROM OUTSIDE THE US: 408-287-0264

JASON-RANHEIM
580 PARROT STREET
SAN JOSE, CA USA 95112

VISA MasterCard AMERICAN EXPRESS

SYMBOL MASTER™

MULTI-PASS SYMBOLIC DISASSEMBLER FOR COMMODORE 64 & 128**

(Includes C-128 native 8502 mode)
disassembles any 6502/6510/8502 machine code program into beautiful source

- Learn to program like the experts!
- Adapt existing programs to your needs!
- Automatic LABEL generation.
- Outputs source code files to disk fully compatible with your MAE,* PAL,* CBM,* Develop-64,* LADS* or Merlin* assembler, ready for re-assembly and editing!
- Outputs formatted listing to screen and printer.
- Automatically uses NAMES of Kernal jump table routines and all operating system variables.
- Disassembles programs regardless of load address. Easily handles autorun "Boot" programs.
- Generates list of equates for external addresses.
- Generates complete cross-referenced symbol table.
- Recognizes instructions hidden under BIT instructions.
- 100% machine code for speed. Not copy protected.

ORDER NOW! $49.95 postpaid USA. Disk only.

*MAE is a trademark of Eastern House. PAL is a trademark of Pro-Line. Commodore 64 & 128 are trademarks and CBM is a registered trademark of Commodore. Develop-64 is a trademark of French Silk. LADS is a trademark of Compute! Publications. Merlin is a trademark of Roger Wagner Publishing.

UNLEASH THE POWER OF YOUR COMMODORE 64 WITH THE ULTIMATE INTERFACE

- Control and monitor your home—appliances, lights and security system
- Intelligently control almost any device
- Connect to Analog-to-Digital Converters
- Control Robots
- Perform automated testing
- Acquire data for laboratory and other instrumentation applications
- Many other uses

Don't make the mistake of buying a limited capability interface. Investigate our universally applicable Dual 6522 Versatile Interface Adapter (VIA) Board, which plugs into the expansion connector and provides: Four 8-bit fully bidirectional I/O ports & eight handshake lines • Four 16 bit timer/counters • Full IRQ interrupt capability • Four convenient 16-pin DIP socket interface connections • Expandability up to four boards & sixteen ports.

ORDER NOW! Price $169, postpaid USA. Extensive documentation included. Each additional board $149.

COMMODORE 64™ SOURCE CODE!

"What's Really Inside the Commodore 64"

• Most complete available reconstructed assembly language source code for the C-64's Basic and Kernal ROMs, all 16K. • You will fully understand calls to undocumented ROM routines, and be able to effectively use them in your own programs. • Uses LABELS. Not a mere one-line disassembly. All branch targets and subroutine entry points are shown. • TABLES are fully sorted out and derived. • Completely commented, no gaps whatsoever. You will see and understand the purpose of every routine and every line of code! • Complete listing of equates to external label references. • Invaluable fully cross-referenced symbol table. Order C-64 Source. $29.95 postpaid USA.

PROFESSIONAL UTILITIES:

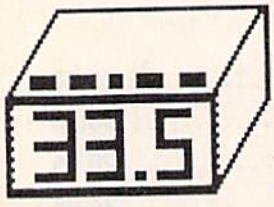
We personally use and highly recommend these two:

- PTD6510 Symbolic Debugger for C-64. An extremely powerful tool with capabilities far beyond a machine-language monitor. $49.95 postpaid USA.
- MAE64. Fully professional macro editor/assembler. $39.95 postpaid USA.

All orders shipped from stock within 24 hours via UPS. VISA/MasterCard welcomed. There will be a delay of 15 working days on orders paid by personal check.

SCHNEDLER SYSTEMS

1501 N. Ivanhoe, Dept. G12, Arlington, VA 22205. Information/Telephone Orders (703) 237-4796



.....TRACK MASTER...™

PLUS with AUDIO-LERT and CONTROL SWITCHES

- TRACK MASTER - SEE VISUALLY THE TRACK AND HALF TRACKS YOUR COPY PROGRAM IS FAILING ON INSTEAD OF GUESSING! FOLLOW HEAD AS PROGRAM IS LOADED TO REVEAL LOCATION OF HEAD BANGING ERRORS AND USE OF HALF TRACKS AND TRACKS BEYOND 35.
- AUDIO-LERT - HEAR YOUR DISK DRIVE WRITE TO THE DISKETTE! COMPARE COPY TRACKS AGAINST ORIGINAL TRACKS.
- CONTROL SWITCHES - PERMIT YOU TO:
  - WRITE PROTECT YOUR DISKETTE.
  - DOUBLE DISKETTE SPACE - BY USING BOTH SIDES WITHOUT NOTCHING.
  - SET DRIVE TO UNIT 8 OR 9.
  - RESET LOCKED-UP DRIVE WITHOUT DISTURBING THE KEYBOARD.
- STILL ONLY - $69.95 plus SHIPPING.

.....MR. COOL.....

- COOLING FAN PACKAGE - FAN, FILTER CORD & GUARD (NO INSTALLATION REQ).
  - REDUCES HEAT STRESS ON PARTS.
  - INCREASES LIFE AND RELIABILITY.
  - ELIMINATES "ALIGNMENT" PROBLEMS.
  - FOR COMMODORE 1541 AND C128.
  - ONLY $19.95 PLUS SHIPPING.
- SENTINEL DISKETTES - COLORS $13.50.

CONTACT: DISKTRONICS
P.O. BOX 962
BEDFORD, IN 47421

PHONE: (812) 279-1752
0800-1600 EST
MON-SAT

SHIPPING: CONT. USA $3.50
CANADA, USA $5.00
UPS COD ADD $3.00.

TERMS: MONEY ORDER
CHECK
COD CASH ONLY

DIGITAL VISION

COMPUTEREYES™

VIDEO IMAGES ON YOUR COMPUTER!

Finally—an inexpensive way to capture real-world images on your computer's graphics display! COMPUTEREYES™ is an innovative slow-scan device that connects between any standard video source (video tape recorder, video camera, videodisk, etc.) and your computer. Under simple software control, a b/w image is acquired in less than six seconds. Unique multi-scan modes also provide realistic grey-scale images. Hundreds of applications!

Package includes interface module, complete easy-to-use software support on disk, owner's manual, and one year warranty all for $129.95 plus $4.00 S&H (USA).

Also available as a complete package including:
- COMPUTEREYES™
- Quality b/w video camera
- Connecting cable

for only $399.95 plus $9.00 S&H.

Demo disk available for $10.00 postpaid (refundable).

See your dealer or order direct. Mass. residents add 5% sales tax. Mastercard, Visa accepted. To order, or for more information, write or call:

ONLY $129.95

Available for:
- Apple II series
- Commodore 64/128
- Atari 800/800XL/65XE/130XE

DIGITAL VISION, INC.
14 Oak Street — Suite 2
Needham, MA 02192
(617) 444-9040, 449-7160

TOMORROW'S TECHNOLOGY IS HERE TODAY . . .

TOTALLY NEW! AN IDEA WHOSE TIME HAS COME!

THE COPY PROGRAM

- WORKS ON 1 OR 2 DRIVES
- EXACT COPIES IN ONLY 21 SECONDS
- SIMPLE-FULL BACK-UP IN A SINGLE KEY STROKE
- RELIABLE—WORKS VIRTUALLY EVERY TIME

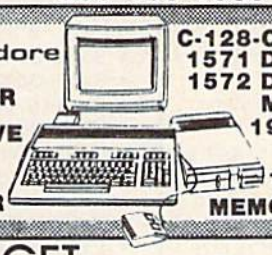
ONLY FROM UNIVERSAL **$79.95**

the 21 Second Back-up

CALL TOLL FREE! 800-468-4689 CALL TOLL FREE!

SPECIAL C-803 PRINTER $79.95

commodore
C64-COMPUTER
1541 DISK DRIVE
1702 MONITOR
1101 D-W PRINTER



C-128-COMPUTER
1571 DRIVE
1572 DRIVE
MOUSE
1901 MONOCHROME MONITOR
1902 RGB MONITOR
MEMORY EXPANSION

CALL US FOR SPECIAL PRICES ON ALL commodore

BLUE CHIP FOR COMMODORE 64

BLUE CHIP DRIVE DISK FOR COMMODORE C64

30% FASTER $159.00

SOFTWARE

BY INFO DESIGNS FOR C64

WORD PRO 3	$34.95
ACCT. PAYABLE	$34.95
ACCT. RECEIVABLE	$34.95
PAYROLL	$34.95
INVENTORY	$34.95
GENERAL LEDGER	$34.95
SALES EDGE	$59.95
MANAGEMENT EDGE	$59.95
NEGOTIATION EDGE	$59.95
COMMUNICATION	$59.95
PRINT SHOP C64/ATARI	$28.00
PRINT SHOP IBM	CALL
LIBRARY 1 & 2	CALL
FAST LOAD	$21.00
NEWSROOM	CALL
BEACH HEAD 1 & 2	CALL

ACCESSORIES

WICO BOSS JOYSTICK	CALL
PAPER (1000 COUNT)	$14.95
INLAND STORAGE CASE HOLDS 60	$10.95
SURGE STRIP 6 OUTLET EMI-RMI FILTER	$27.95

GET **FREE GIFTS** from the

Konica *Gift Boutique*

COLLECT VALUABLE COUPONS INSIDE EVERY **Konica®** VHS and Beta Video Cassette

$5.49

SL WABER PRODUCTS IN STOCK

INTERFACES

XETEC SUPER GRAPHICS 8K BUFFER, NLQ MODE, 20 FONTS	$68.00
XETEC SUPER GRAPHICS JR NLQ MODE	$39.00
TYMAC CONNECTION ALL PRINTERS	$69.00

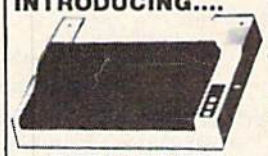
DISKS

NASHUA SS 3 BOXES OF 10	$24.95
NASHUA DS/DD	$14.95
NASHUA MF-1 3½"	$29.95
MAXELL SS/DD	$13.95
MAXELL DS/DD	$21.95
SENTINEL 10 COLOR W/CASE	$15.95
SENTINEL 10 COLOR W/CASE DS/DD	$19.95

TRY OUR OWN TOP QUALITY UNIVERSAL DISKETTES ONLY $14.95 bx

PRINTERS

INTRODUCING.... **Write Hand™** FROM COPAL



WRITE HAND 1200L $219.00
10" CARRIAGE
NEAR LETTER QUALITY MODE
120 CPS

WRITE HAND 1500L $299.00
10" CARRIAGE
NEAR LETTER QUALITY MODE
180 CPS

WRITE HAND 5500 $389.00
15" CARRIAGE, 180 CPS

MODELS AVAILABLE FOR IBM

star

SG 10	CALL
SG 10 C	$249.95
SG 15	CALL

OLYMPIA

NP 165 CPS D/M	$299.00
RO LETTER QUALITY W/TRACTOR	$319.00
COMPACT 2	$369.00

OKIDATA

OKI 10 W/INTER	$189.00
OKI 20	CALL

BLUE CHIP

120/10 120 CPS, 10" CARRIAGE	$179.00

CALL FOR OTHER MODELS

UNIVERSAL MKTG.

475 MAIN ST.
FARMINGDALE, NY 11735

RUSH ORDER HOTLINE

800-468-4689

LOCAL CALL (516) 753-0110

MASTERCARD, VISA, M.O. OR CHECK
NY ORDERS ADD SALES TAX
NO EXTRA CHARGE FOR VISA OR MASTER CARD

SEND $5.00 FOR CATALOG & ADDITIONAL SPECIALS
SCHOOL AND DEALERS WELCOME

No returns without authorization number. All products are new merchandise sold with manufacturers warrantee.
All Prices & Availability subject to change without notice. Prices are mail order only and do not include shipping & handling.

IN CANADA CALL: (514) 445-9663 / CALL FOR OUR OTHER N.Y. LOCATIONS

C-64 & C-128* OWNERS:

Now YOU too can get the "Software Edge"!

Stop playing "Hide-and-Seek" with your Disk software! Let your Commodore 64™ "memory" do all the work for you with **MASTERDISK©**. Easy Manual and Program Menu-Screens make everyone a "pro" in 1 day!

Here's a small "PEEK" at SOME of the FULLY-INTEGRATED POWER of PRODUCTIVITY at your fingertips. . .

- a SORTED Master Catalog of ALL your Disks (even those un-listable "protected" Directories: Names, ID's, File info, etc.)
- Search + List any File/Disk/ID in seconds, automatically, in any of SEVEN WAYS.
- Transfer ML-Programs or Files from Disk to Disk (CATEGORIZE your software)
- Stop disaster before it strikes: change duplicate ID's fast, without total re-copy.
- Restore accidentally-scratched files in a flash, with VERIFICATION that they're OK.
- Works with 1 or 2 Single Disk Drives (1541, MSD, etc.) with or without Printer (Commodore or ASCII).
- Handy-Reference Card for HEX/ASCII/BINARY-TO-DECIMAL VALUE TRANSLATION + FORMULAS, included FREE.
- All this + MUCH MORE, for just $34.95. (U.S.A.), $45.95 (Canada)

NEW!! - MASTERDUAL©, "Son of MASTERDISK©" . . . same power, but with Dual Drive Speed!

- Same Catalog Features as MASTERDISK©
- Same Disk repair functions, too
- For all C-64 & C-128* systems with Dual Disk Drives (4040, MSD, etc.)
- Utilizes all Dual Drive functions for maximum speed and ease of use
- FREE Handy Reference Card for HEX/ASCII/Binary to Decimal Translation + Formulas
- Experience FULLY-INTEGRATED POWER for just $29.95 (U.S.A.), $39.95 (Canada)

***MASTERDISK© and MASTERDUAL©** are also compatible with the NEW C-128 (in C-64 Mode)!

We ship within 24 hours! **Send Money Order or Check to:**

INTEGRATED-SOFTWARE SYSTEMS
P.O. Box 1801, Ames, IA 50010
VISA/M.C./C.O.D., Call **(515) 233-2992**
9 a.m. - 9 p.m. (Central Time) Mon.-Fri.
Add $3 Shipping/plus $2 Foreign, C.O.D.
IA Residents add 4% Sales Tax.

IN CANADA: Cricket Distribution Co.,
P.O. Box 953, Cobourg,
Ontario, Canada K9A 4W4
VISA/M.C./C.O.D., Call **(416) 372-3692**
9 a.m. - 6 p.m. (Eastern Time) Mon.-Fri.
Add $3 Shipping/plus $2 C.O.D.
Ontario Residents add 7% Sales Tax

Whether you have tens or hundreds of disks, now YOU can be the MASTER of your TOTAL Software Library!

You Have a Choice.

Numeric Keypads

CP Numeric Keypad, Deluxe Model.

- Top quality, low profile key switches for smooth, reliable data entry.
- Easily connected with computer keyboard.
- No software is required. 100% Compatible with all programs.
- Available for Commodore 64, SX-64*, VIC-20 and Apple IIe Computers.
- One year warranty and available in three models:

Regular $49.95

Plus $59.95

Deluxe $69.95

Power Supply

- Has better features than the original one at $39.95.
- Is serviceable, NOT disposable.
- Works dependably with one year warranty.
- For Commodore and Atari* Computers.

Computer Place (213) 325-4754

23914 Crenshaw Blvd. Torrance, CA 90505

* Requires adaptor at additional cost. VISA, MC & AE accepted. No C.O.D. Add $3.00 shipping. CA residents add 6.5% sales tax. Dealer inquiries welcome.
Commodore 64, SX-64 and VIC-20 are trademarks of Commodore Business Machines, Inc. Atari is the trademark of Atari Corp.; Apple IIe is the trademark of Apple Computer, Inc.

Program Your Own EPROMS

▶ VIC 20
▶ C 64

$99.50

PLUGS INTO USER PORT.
NOTHING ELSE NEEDED.
EASY TO USE. VERSATILE.

- Read or Program. One byte or 32K bytes!

OR Use like a disk drive. LOAD, SAVE, GET, INPUT, PRINT, CMD, OPEN, CLOSE—**EPROM FILES!**

Our software lets you use familiar BASIC commands to create, modify, scratch files on readily available EPROM chips. Adds a new dimension to your computing capability. Works with most ML Monitors too.

- Make Auto-Start Cartridges of your programs.
- The *promenade*™ C1 gives you 4 programming voltages, 2 EPROM supply voltages, 3 intelligent programming algorithms, 15 bit chip addressing, 3 LED's and NO switches. Your computer controls everything from software!
- Textool socket. Anti-static aluminum housing.
- EPROMS, cartridge PC boards, etc. at extra charge.
- Some EPROM types you can use with the *promenade*™

2758	2532	462732P	27128	5133	X2816A*
2516	2732	2564	27256	5143	52813*
2716	27C32	2764	68764	2815*	48016P*
27C16	2732A	27C64	68766	2816*	

▶ *Commodore Business Machines *Denotes electrically erasable types

promenade™

Call Toll Free: 800-421-7731
In California: 800-421-7748

JASON-RANHEIM
580 Parrott St., San Jose, CA 95112

VISA MasterCard

COMMODORE 64 PROGRAMS . . .

$3 EACH ! !

WHY PAY MORE FOR QUALITY PROGRAMS?

WE ARE THE LOWEST COST ORGANIZATION

SPECIALIZING IN SOFTWARE FOR THE COMMODORE 64 . . .

IN THE WORLD !

The Commodore Software Association is a world-wide software organization specializing in the distribution of owner/user written software. Our purpose is to bring a wide range of quality software at the lowest possible cost.

How can you sell programs for only $3 each?
The name of the game in cutting costs is volume. Volume of membership (in the tens of thousands) and purchasing (also in the thousands). We also lower our costs with the wide range of programs we offer.

$3 programs? Are they really quality programs?
Any program submitted to us has to meet our high standards. We reject any program that does not meet high industry standards of quality and sophistication.

How many programs are available?
We currently have more than **1000** programs in our Commodore 64 software library. Most are in our up-to-date Commodore 64 catalog. The list grows daily as submissions pour in from around the world. Members will receive regular catalog expansions.

Programs are categorized as follows:
GAMES, GRAPHICS, MUSIC, EDUCATION, BUSINESS, HOME, APPLICATION, and UTILITY.

How do I get a list of programs?
Membership entitles you to our extensive software catalog with listings categorized by type of program.

What else does membership provide?
Membership entitles you to our newsletter REMarks. It contains hints, program reviews, problem solvers and tips that make using your Commodore 64 easier and simpler, and expand its capability.

Do I have to be a programmer to benefit?
Not at all. However, if you do program and want to submit a program to our software library, we have a generous software submission system.

What does it cost to join?
Only a low membership fee of $15 per year. That entitles you to our newsletter, plus all the benefits mentioned above, and quality programs for only $3 each. What's more, we'll mail out membership materials the very same day that we receive your membership fee!

★ INCREDIBLY LOW PRICES ★

Members may purchase ANY PROGRAM from our Commodore 64 catalog for ONLY $3.00 per program—no tricks, no gimmicks. Programs available on cassette or disk. There are NO additional charges, the price of $3.00 per program also includes postage, handling and all applicable taxes.

★ HIGH QUALITY ★

These programs ARE NOT small, simple programs. Our programs are large and high quality. They make extensive use of high resolution graphics, color, sound synthesis and advanced programming techniques. In fact, most of our programs make nearly complete usage of the 64's memory. They're FAST, too.

★ USER FRIENDLY ★

All programs are completely documented and are very easy to load, RUN, and operate. No programming knowledge required.

MEMBERSHIP. . .$15.00

I'm interested in programs for only $3 each. Here's my membership fee of only $15.00. This entitles me to your newsletter, your extensive software catalog, and programs for only $3 each.

☐ CHECK OR MONEY ORDER ☐ VISA ☐ MASTERCARD

Card # _____ Exp: _____

Name: _____

Address: _____

City _____

State _____ Zip _____

CSA COMMODORE SOFTWARE ASSOCIATION

COMMODORE SOFTWARE ASSOCIATION
P.O. Box 83655, LOS ANGELES, CA 90083

IS IT POSSIBLE TO MAKE THE BEST ANY BETTER?!

The MW-350 is getting better with age because of these new additions:

- Standard 4K Buffer
- Special Software Modes
- Supports more printers

★ ★ ★ ★ ★ ★ ★ ★

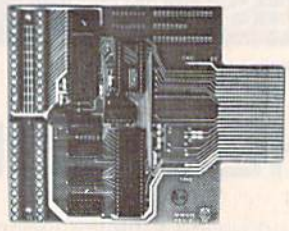
And it still has:

- Built-in Self Test with Status Report
- Microprocessor controlled emulation of Commodore printers for compatability with popular software
- Optional Transparent Mode
- External switch selectable Commodore graphics mode for Epson, Star Micronics, C. Itoh Prowriter, Okidata, Seikosha, Banana, BMC, Panasonic, Mannesman-Talley, Think Jet & others.

NEW INTRODUCTORY SALE!
PRICE $89.00
OR ..... $79.00 with trade in of your old interface

Universal Input/Output Board for C-64 & C-128

- 16 Channel 8-bit A/D converter with 100 microsecond sampling time.
- 1 D/A output
- 16 high voltage/high current discrete output
- 1 EPROM socket
- Use multiple boards for additional channels up to 6 boards



MW-611 ..... $225.00

Dealer Inquiries invited

VISA MasterCard

Micro World Computers, Inc. (303) 987-9531
3333 W. Wadsworth Blvd. #C105
Lakewood, CO 80227

XMAS GIFT

Enter a seven digit phone no. on your **COMMODORE** computer and **PHONE-WORD** will print out as many as 2187 words (each will be 7 characters long). Dial any of these words and get the original phone no.

PHONE-WORD generates all the possible letter combinations for a phone number, i.e. 529-7767 generates: **KAYPROS, JAWS-POP, LAW-PROS, JAYS-POP, LAW-7767** and 2182 others (not all make sense).

The printed list of generated words from a phone no. makes a great **XMAS Gift** for yourself, your friends and associates. Make your own phone number easy to remember.

Was $29.95, **NOW ONLY $19.95** until Christmas. **PHONE-WORD** is tax deductible if you plan to offer the output for sale.

Send check or money order today with your name and address to:
DECISION SCIENCES, INC., 9133 N. LONG, Suite 100, SKOKIE, IL 60077.

Specify whether you want a floppy diskette or a tape cassette.

COMMODORE is a trademark of COMMODORE ELECTRONICS, LTD.
PHONE-WORD is a trademark of DECISION SCIENCES, INC.

BACKUP PROTECTED SOFTWARE *FAST* with COPY II 64™

From the team who brought you **COPY II PLUS** (Apple), **COPY II PC** (IBM) and **COPY II MAC** (Macintosh) comes a revolutionary new copy program for the Commodore 64, **COPY II 64** ver. 2.0!

- Copies most* protected software — *automatically.*
- Copies even protected disks in just 2 minutes (single 1541 drive).
- Copies even protected disks in just 1 minute (dual 1541 drive).
- Maximum of four disk swaps on a single drive.
- Copies half and full tracks.

Call M-F 8-5:30 (W. Coast time) with your VISA MasterCard : **503/244-5782.**
Or send a check (add $3 s/h, $8 overseas) to

$39.95

CENTRAL POINT Software, Inc.
9700 SW Capitol Hwy. #100
Portland, OR 97219

* We update Copy II 64 regularly to handle new protections; you as a registered owner may update at any time at a reduced price.

This product is provided for the purpose of enabling you to make archival copies only.

ENTERTAINMENT SOFTWARE DESIGNERS

MicroProse Software — the leader in simulation software for home computers, is looking for a few of the best top-flight professionals to join our rapidly growing simulation software design team in beautiful Hunt Valley, Maryland. Qualified individuals will have a genuine interest and commitment to game design and experience in machine language programming on 6502, 8088, or 68000 microcomputers.

We offer a challenging, super-charged environment where your outstanding effort and commitment will be recognized and rewarded. You'll be part of a first-rate design team — our simulations continue to be ranked at the top of the software best-seller charts. So, if outstanding compensation, profit sharing, future equity, recognition and the opportunity to be part of a dynamic organization is what you're aiming for, send your resume and an example of your best work in a hurry to:

John Harris
Manager, Software Department

MICRO PROSE
SIMULATION • SOFTWARE
120 LAKEFRONT DRIVE • HUNT VALLEY, MD 21030
301-667-1151

ULTRABYTE DISK NIBBLER VERSION 2.0

TOP - RATED COPIER DRAMATICALLY IMPROVED

INFO - 64 Magazine, June 1985, compared Commodore 64 copy programs and awarded the Nibbler its highest rating. Now the Nibbler has been improved to copy dozens of the latest programs that previously could not be copied, all in less than three minutes.

FOR SINGLE 1541 & DUAL MSD DRIVE

- **Simple. Even a beginner makes perfect copies**
- **Fast. Copies protected disks in three minutes**
- **Sophisticated. Senses the disk being copied and automatically adjusts for dozens of protection schemes. Copies 99+% of software**
- **Modular design to allow easy updates**
- **Even copies itself. For this reason, no refunds will be given**

$ 39.95 plus $ 4.00 shipping & handling.

Mastercard, Visa, Check or M.O., Calif. add 6.5% ($2.60) sales tax.
Foreign orders or COD add $2.00. Payment must be in U.S. funds.
Previous customers may order V 2.0 for $20.00 plus $4.00 shipping

NIBBLER V 2.0 EVEN COPIES ITSELF

To order, write or call 24 hr. order line
For information, write. Phone for orders only

ULTRABYTE (818) 796 - 0576
P.O. Box 789 La Canada, CA 91011 USA

DEALERS & DISTRIBUTORS WANTED

THE PERFECT STOCKING STUFFER!

Underware™ makes custom T-Shirts in minutes!
With the Underware Ribbon your printer makes iron-on transfers of any screen image! Just print the image on plain paper using an Underware Ribbon, then iron it on to your own T-Shirt. Each ribbon makes 30-100 permanent and washable transfers.

Adding color is simple & inexpensive
With a set of Underware ColorPens you can add up to seven colors to any transfer made with an Underware Ribbon. Just color the plain paper transfer and iron it onto a T-Shirt.

A complete selection of Underware Products. . .
The ribbon is available for the NEC 8023, C. Itoh, Imagewriter, Okidata, Star Gemini, and Epson dot matrix printers. For other printers — try our new Iron-on Coloring Kit with special carbon transfer paper. Please call for details.

NOW WORKS WITH PRINT SHOP™

- Underware Ribbon **$14.95**
- Underware ColorPens (set of 5) **$14.95**
- Underware Jumbo ColorPens (set of 7) **$19.95**
- Underware Iron-on Coloring Kit **$19.95**

UNDERWARE™ VISA MasterCard

Diversions, Inc. 415-591-0660
1550 Winding Way, Belmont, CA 94002

ANNOUNCING!

THE END OF THE EXPANSION BOTTLE-NECK

Now, use disk drives, modems, parallel printers and more ....all at the same time!

Universal Interface -- connects to C-64, provides buffered bus, operating system, and device selection. *NOW! Includes board power supply* $49.95

NOTE: All boards below require the Universal I/F be connected to the computer.

Floppy -- controls 4 single, double, or quad density 5-1/4" drives, or 8" drives.
NEW lower price! $124.95

Dual 5-1/4" drive cable $19.95

Ramdisk -- contains 256K of RAM, *expand on board to 512K*, or with expansion board to 4 *megabytes*. Transfers over 70K bytes/sec.
NEW! lower price ..$179.95(256K) ...$229.95(512K)

Print Spooler -- contains 64K buffer, *expandable to 256K*. Controls 2 parallel printers $129.95

5 ft. printer cable $24.95

RS-232 Controller -- contains 64K buffer, *expandable to 256K*. Controls 2 serial ports. Baud rates to 19,200.
Contains +/-12V supplies on-board $149.95

5 ft. male or female RS-232 cable $12.95

To order or for information (ask for our catalog):

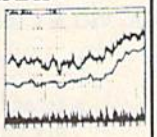
WRITE: Research Service Labs
P. O. Box 19124
OKC, OK 73144

CALL: (405)745-9322
8am-4pm CST
Monday-Friday

ACORN OF INDIANA™

STOCK BROKER™

Beat The Pants Off Mutual Funds



BUYING GOOD QUALITY, VOLATILE ISSUES AND USING THIS TRADING SYSTEM WILL HAVE YOU FULLY INVESTED AT THE LOWEST PRICES AND CONVERTING TO CASH AS THE STOCK NEARS ITS PEAK

- BAR GRAPH PRINT-OUTS
- RECORD UP TO 144 STOCKS ON A DISK

$49.95 C-64 DISK

LOTTO CIPHER™

GET THE BEST ODDS ON ANY LOTTERY SIX NUMBER - PICK FOUR - DAILY GAME

- PRODUCES FOUR COMBINATIONS OF NUMBERS TO CHOOSE FROM
- ANY AMOUNT OF BALLS AND NUMBERS CAN BE PROGRAMMED
- PRINTS OUT PAST LOTTO NUMBERS DRAWN, PAST COMPUTER PICKS, AND NUMBER DRAW FREQUENCY LIST
- COMPLETE NUMBER DATA BASE

$29.95 C-64 DISK

ABANDON SHIP™

S.O.S.

SAILOR JOE HAS VOLUNTEERED TO STAY BEHIND AND KEEP THE SHIP AFLOAT UNTIL HIS CREW MEMBERS ARE RESCUED. CAN HE MAKE IT OR WILL HE HAVE TO ABANDON SHIP. PATCH THE HOLES AND SEAL OFF HOPELESS ROOMS WHILE FIGHTING INVADING SEA CREATURES

$29.95 C-64 DISK

ACORN OF INDIANA, INC
2721 OHIO STREET
MICHIGAN CITY, IN. 46360

219-879-2284

SHIPPING AND HANDLING, ADD $1.50 - C.O.D.'S ACCEPTED
VISA AND MASTER CARD ORDERS ADD 4%
INDIANA RESIDENTS ADD 5% SALES TAX
Dealer Inquiries Welcome

Beat The Overpriced Software Blues With Home Software Systems

C64 & C128
SOFTWARE COLLECTIONS

Five different Program Disks featuring:

- Menu Driven Autoload Routines
- On-Line Documentation and Help
- 20-30 Programs per Disk
- Professionally Programmed
- Not Copy Protected or Copywrited

Arcade and Card Games. Exciting, arcade style action games and card games like Blackjack, Poker, Keno, Spades and more.

Board and Strategy Games. Play Chess, Backgammon, SuperTrek, Monopoly, Adventure & more.

Disk and Utility Programs. Fast copier, disk editor, and manager programs ... a programmers dream. Includes many other programs.

Business Programs. Spreadsheet, stock analysis, word processing, checkbook, annuity and statistical programs.

Print Utility Programs. Print labels, mailing lists, calendars, disk directories and more. For Gemini and Commodore.

Send $14.95 + 2.00 S & H per disk or $64.95 + 3.00 S & H for the 5 disk collection to:
(MC/VISA accepted: MI Residents add 4%)

Home Software Systems
P.O. Box 85
Sterling Hts., MI 48077

Copy Worldwide Short-wave Radio Signals on Your Computer

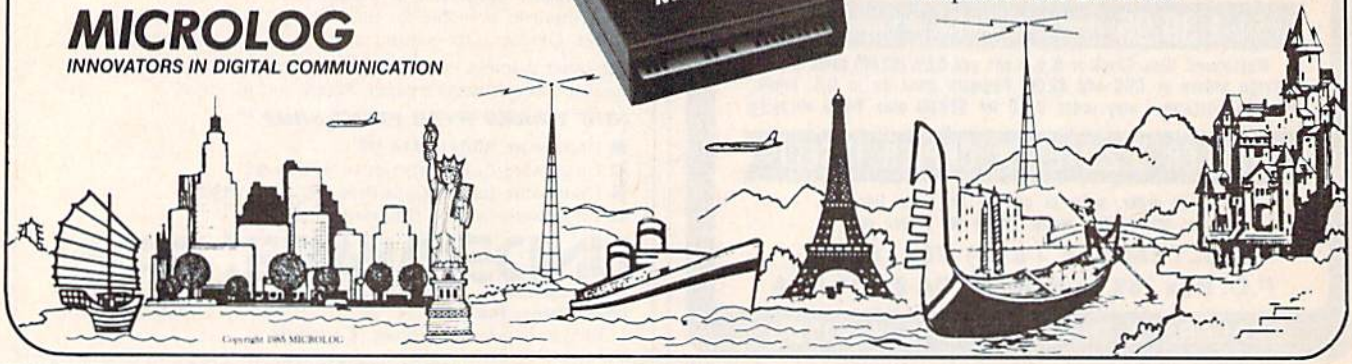
Remember the fun of tuning in all those foreign broadcast stations on the short-wave radio? Remember those mysterious sounding coded tone signals that baffled you? Well, most of those beeps & squeals are really digital data transmissions using radioteletype or Morse code. The signals are coming in from weather stations, news services, ships & ham radio operators all over the world. Our short-wave listener cartridge, the "SWL", will bring that data from your radio right to the video screen. You'll see the actual text as it's being sent from those far away transmitters.

The "SWL" contains the program in ROM as well as radio interface circuit to copy Morse code and all speeds/shifts of radioteletype. It comes with a cable to connect to your radio's speaker/earphone jack, demo cassette, and an excellent manual that contains a wealth of information on how to get the most out of short-wave digital DXing, even if you're brand new at it.

For about the price of another "Pac-Zapper" game, you can tie your Commodore 64, 128 or VIC-20 into the exciting world of digital communications with the Microlog SWL. $64. Postpaid, U.S.

MICROLOG CORPORATION,
18713 Mooney Drive,
Gaithersburg, Maryland 20879.
Telephone: 301 258-8400.

MICROLOG
INNOVATORS IN DIGITAL COMMUNICATION



BETTER KEYBOARD UTILITY.

A simply elegant solution—blank "Cheat Sheets" give you the keyboard commands you need, instantly, for any program.

A pack of 12 cards die cut to fit your keyboard. Ready for YOU TO FILL IN. Have all of your program commands right where you want them . . . on your keyboard. Order a couple of packs today.

set of 12 custom die cut sheets **$12.95** set of 24 custom die cut sheets **$19.95**

BETTER DUST PROTECION FOR AMIGA, VIC & C-64

Choose an attractive stat-free cover for your keyboard, monitor or complete system.

Deluxe covers are custom-fitted to each element of your Commodore, and are sewn, not glued with a special dust proof, tightly woven fabric. Neutral color fits beautifully in any office or home. Available for Amiga: monitor and system unit cover ($17.95), Amiga monitor only ($12.95), Amiga system unit only ($12.95). Available for C-64: computer cover ($10.95), monitor cover ($12.95), 1541 disk drive cover ($9.95), data-set cover ($7.95). Printer covers (specify type and size) $14.95.

FOR AMIGA OR C-64

$7.95 to $14.95

We Can Solve All Your Commodore Color Problems

Unique Problem Solvers for Older Commodores (with 5 Pin Monitor Din Plug).

The Interference Stopper installs in minutes with two simple solder connections. Absolutely stops 90% of the RF interference. **$15.95**

The Color Sharpener. . . Use if your "old 64" is hooked up to a TV. Just plug into the monitor plug, and the color and contrast immediately improve. **$18.95**

The NEW Color Sharpener CABLE. . . Use if your "old 64" is hooked up to a monitor. A new 2 prong cable, with a Color Sharpener built in for your monitor. **$24.95**

The Monitor "Improver". . . If you have a Commodore 1701 monitor, this cable (3 prong) gives you a picture you won't believe. Better than the cable Commodore built. (Also hooks your "old 64" to the 1702). **$24.95**

RESET SWITCHES

2 Versions for Every Need

At last, the "needed" switch for Vic-20 and Commodore. Commodore left out a reset switch. Our switches will return control to you every time.

Version 1—Install it Yourself. Requires two simple solder connections, and drill a small hole. Works great. **$9.95**

Version 2—Use in any Commodore Application. A special buffered flow-thru version, that simply plugs in and provides your computer with a serial port and a reset switch. The ultimate in versatility, convenience and simple installation. No soldering. **$21.95**

Order Today!

Please send me the following: (Please describe fully. Send U.S. funds only.)
Your satisfaction guaranteed or your purchase price refunded.

Qty.	Item	Price
		$
		$
		$
Total for Merchandise		$
Shipping and Handling (foreign orders add $5.00)		$ 2.50
5% State Tax (WI Residents only)		$
TOTAL ENCLOSED		$

Please charge to ☐ MasterCard ☐ VISA
Number _____
Expires _____

SHIP TO:
Name _____
Address _____
City _____
State/Zip _____

Mail to:
Bytes & Pieces, Inc.
550 N. 68th St.
Wauwatosa, WI 53213/(414) 257-1214

C-64™ • VIC™ • SX-64™ • C-128™ • Plus 4™ • C-16™ • B-128™ • PET™ • CBM™ • LCD™

Bought Expensive Software Lately? Brace Yourself.

The Intelligent Software package: an integrated home/business/educational package of **25 programs** on disk or tape at the ridiculous price of **$29.95** (plus five cents for postage + handling).

The package is not public domain or home-brew software; totaling over 51 pages of source code listings, it is the one product that can take care of all your data processing needs. One customer writes: ". . . *accolades for the authors. This is as slick a deal as I have seen and more than adequate for all except fancy presentations. The best thing is the ease of use* . . " The package includes:

Database: A complete multi-keyed fixed-record-length data base manager. Sort or select (using all relational operators: , = , > , < , AND, OR, NOT, wild card) on any field, perform computations on numeric fields. Any operation can be performed on all, or only selected records. All fields completely user-definable. Can be used for any number of tasks, including accounting, mailing lists, inventory control, record, tape, or book cataloging, expense account maintenance, or as an electronic rolodex. Even if you use your Commodore for nothing else, this program alone might justify its expense.

Word Processor: A full-featured menu-driven word processor including: very fast file commands, screen editing, text locating and full control over margins, spacing, paging, indentation, and justification. " . . . *well done and highly functional . . . Provides an excellent alternative to the high priced word processors . . . this is an excellent buy. Highly recommended.*" — Midnite Software Gazette. "*Provides good basic features.*" — Compute's Gazette.

Copycalc: An electronic spreadsheet. Turns your Commodore into a visible balance sheet; includes screen editor. "*Excellent program for budgeting, estimating, or any math-oriented use . . . well worth the money. Highly recommended.*" — Midnite Software Gazette.

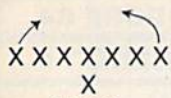
Also included: **ReportGen, ReportMerge** (interface W/P with Database to create form letters, statements, invoices, mailing labels, other reports.); **Baseball Statistician** (compiles batting statistics for a baseball league); several W/P utilities, including **Index** (indexes W/P's text files); several Database utilities, including **DBmerge** (facilitates multi-file database applications.), and **DBStat** (analyzes D/B files); a programming utility, **ASCII,** which converts text files (program listings) into program files; also **Checkbook**; **Inventory**; **Paper Route**; **Loan Analysis**; **Breakeven Analysis**; **Depreciation**; **Labeler**; **File Copier**; more.

Versions of the package are available for every Commodore computer having a minimum of 10k RAM. All programs will support tape, disk, and printer. Price includes documentation and shipping; Calif. residents add 6%. Add $3 for credit card, COD, 8050 disk, or cassette orders (cassette not available for Plus4™ and 16™.) No personal checks from outside USA. This ad is the catalog; a sampling of program output is available for $2.

Intelligent Software
Quality Software since 1982

Box A Dept. G-6
San Anselmo, CA 94960
(415) 457-6153

COMPU–SCORE



GET THE EDGE!
C64 & 1541 REQ

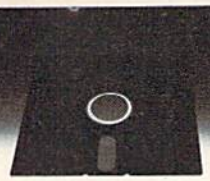
DON'T BUY OBSOLETE SOFTWARE

- NFL, USFL, CFL or any other similar league
- Flexible season schedule
- Statistics available in your local newpaper
- All info readjusted weekly
- System LOGIC passes over old or inaccurate information
- Predicts box scores w/points
- Printer option on all prediction screens (Commodore graphic printers only)

DISK $64.95 | **C.O.D. MONEY ORDER**

HARDY SERVICES
121 E. BROAD ST.
PALMYRA, N.J. 08065
(609) 786-9460

DISKS 69c



Foolish to pay more.
Dangerous to pay less.

- QUALITY MEDIA
- LIFETIME REPLACEMENT GUARANTEE
- HUB RINGS
- TYVEC EPS.
- WRITE PROTECTS

	1+	50+	100+	250+	500+	1000+
5.25" SSDD	.95	.89	.85	.79	.75	.69
5.25" DSDD	1.10	.99	.95	.89	.85	.79
PC FORMATTED	1.35	1.29	1.25	1.20	1.10	1.05
AT 1.2MB	3.00	2.89	2.49	2.39	2.19	2.09
3.5" 1D (For Mac)	2.70	2.60	1.99			
3.5" 2D (For HP)	3.50	3.25		3.15	CALL	CALL

BLACKSHIP COMPUTER SUPPLY
P.O. Box 883362
San Francisco, CA 94188
In California 415-550-0512
USA orders **800-431-6249**
In Canada 403-428-6229

Add $3.00 shipping and handling per 100 Diskettes.
COD add $1.95. (CA residents add 6.5% sales tax)
VISA/MC/COD

STATE-OF-THE-ART MAGNETIC MEDIA
5¼" DISKETTES

- With Hub Rings
- With Write Protect Tabs
- With Static-Free, Dust-Free Envelopes
- With User ID Labels
- In Factory Sealed Poly Packs

69¢ Single Side Double Density
79¢ Double Side Double Density

100% ERROR FREE - LIFETIME WARRANTY
MEET OR EXCEED APPLICABLE ANSI, ECMA, ISO STANDARDS

Minimum quantity 50 diskettes. Discount for 300 or more diskettes. **Shipping and Handling:** $4.00 per 100 diskettes. Reduced shipping charge for larger quantities. C.O.D. add $4.00. Cash or certified check. MI residents add 4% sales tax. Prices subject to change without notice.

C.O.D.

Precision Data Products
P.O. Box 8367, Grand Rapids, MI 49508
(616) 452-3457 • Michigan 1-800-632-2468
Outside Michigan 1-800-258-0028

MOUSE FOR C-64
IDEAL MAGIC MOUSE FEATURING:
- HIGH RESOLUTION GRAPHIC DESIGNER
- SPRITE DESIGNER
- ICON DESIGNER
- SCREEN DUMP TO MOST PRINTERS

IDEAL CG-103
- STEEL SHAFT HANDLE
- LEAF SWITCH
- SAME STRUCTURE AS WICO 3 WAY

IDEAL CG-125
- TOP ARCADE W/ TRIGGER FIRE BUTTON
- HEAVY DUTY BASE W/ RUBBER SUCTION

IDEAL CG-1000
- HIGHLY RELIABLE MICROSWITCH
- SELECTABLE SPEED CONTROL
- SELECTABLE AUTO FIRE
- ALL METAL TOUGH STRUCTURE

COMPLETE LINE OF COMMODORE® AND ATARI® JOYSTICKS AND A VARIETY OF ACCESSORIES AVAILABLE AND LOTS MORE ITEMS TO CHOOSE FROM...
We Are Joystick Specialists!
DEALER INQUIRIES WELCOMED!

CONTRIVER ENTERPRISES CO., LTD.
1035 CLARK DRIVE, VANCOUVER, B.C., CANADA V5L 3J9
TEL: (604) 251-9925, 291-9733
TELEX: 04-51112 CONTVER

RPM
REPLACEMENT POWER SUPPLY
for Commodore C64 and VIC-20's

SPECIAL FEATURES
- Serviceable -- not disposable!
- Surge Protected!
- Spike Protected!
- TWO fused circuits (computer and accessory)
- Power Indicator Light
- 4 extra 110-120 volt outlets for peripherals
- 2 year warranty
- Master ON-OFF Switch
- Long Cords

Retails at $69.95
AVAILABLE TO DISTRIBUTORS ONLY THROUGH:
R.P.M. Concepts, Ltd.
60 E. Main St., Alliance, Ohio 44601
Call 800-821-1297 IN OHIO 800-821-8555
VISA - MASTERCARD - C.O.D.
RPM

PlayNET
National Color C64 Network

GET
$19.95 FREE TIME

CALL
1-800-PLAYNET
FOR DETAILS

C-64 COVERS
CUSTOM FIT • LIGHT TAN
LIFETIME WARRANTY

VIC20/C-64/1541/1525
MPS-801/802/1526/SFD1001
Gemini10/10X/EpsonFX,RX80
1701/1702/1903/1902

ALL COVERS $6.95

C-64 power supply-1yr warr. $27.95
1541 cooling fan w/on-off
2 extra outlets - $27.95
★★★★ Monthly Special ★★★★
Nashua Blank Label
5¼ SS/DD 70¢ DD/DD Add 10¢

Enclose check or M/O for items ordered +$3.00 shipping & handling. CA. residents add 6.5% tax.

DES-PRODUCTIONS
9067 BUHMAN St.
DOWNEY, CA 90240

NOW! V
DECISION ANALYSIS
for the
Commodore 64

- Menu Driven
- Documents and Structures the Decision Process
- Allows Over 30 Decision Criteria
- Up to 150 Alternatives
- Save and Reload Decision Data
- ***Make Decisions On:***
  Which House to Buy
  Which Applicant to Hire
  Where to Locate a Branch
  Which Computer to buy or any
  Decision with multiple alternatives

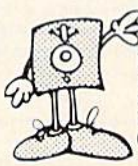
$24.95 - 1541 Disk
CA Residents add $1.50 sales tax

R. Lewter & Associates
5104 Linda Lou Drive
Carmichael, California 95608

Commodore 64 is a Registered Trademark of Commodore, Inc.

Maxell Floppy Disks
The Mini-Disks with maximum quality.

Dealer inquiries invited. C.O.D's accepted.
Call FREE (800) 235-4137.



PACIFIC EXCHANGES
100 Foothill Blvd., San Luis
San Luis Obispo, CA 93401.
In Cal. call (800) 592-5935 or
(805)543-1037.

UNISOURCE

Your one source for computer hardware, software and peripheral needs since 1981.

What is Unisource? • A leading mail order computer company with a friendly, knowledgeable staff • Accepts VISA & MasterCard at never any additional cost • Provides toll free order lines • Ships in-stock merchandise usually within 48 hours • Discount prices on all products

$239.95 (with purchase of TurboPrint Interface right)

star SG 10

This price-leading dot matrix printer has a NLQ mode that really is near letter quality! The new SG 10 from Star Micronics is a speedy 120 cps in draft mode and is almost daisy-wheel quality in LQ mode. This printer has easy access format switches, friction and tractor feed for personalized stationery and fan-fold paper, downloadable characters for great graphics, and ultra high resolution bit image graphics for precision plotting and graphics. Order with the fully compatible printer interface below for even greater savings.

The SG 10 has a suggested retail of $299.95. Our everyday low Unisource price is $249.95. But order the printer interface with your SG 10 and receive extra savings on both the printer and the interface! The SG 10 is only $239.95 when you purchase either of the Turbo Print interfaces. Order part number **SG 10.**

VOLKSMODEM XII

Open up the world of telecommunications with this powerful 300-1200 baud smart modem specifically designed for your Commodore computer. This is a complete modem-cable-software package. Suggested retail on the package is $339.95 — Unisource low priced at $219.95! The unit is capable of full unattended operation in conjunction with stand alone terminals and computers which have an RS 232 interface. Volksmodem XII features full Bell compatibility, serial command operation, full and half duplex, auto answer, auto dial, tone and pulse dialing, busy detection and more — all of the features found on modems costing hundreds more! **ANC 107C** **$219.95**

$219.95

We'd like to send you a copy of our exciting new catalog covering a full range of Commodore 64 products. It's free just for the asking. Simply fill out this coupon, clip, and send it to the address indicated. We'll put you on our mailing lists and send our complimentary catalog.

Name _____

Mailing Address _____

City, State, Zip _____

"INCREDIBLE!"

BLUE CHIP DISK DRIVE

ONLY $178.95

State-of-the-art technology enables this Blue Chip BCD/5.25 disk drive to be more compact, require less power and generate less heat than its Commodore counterpart. This disk drive is fully compatible with all Commodore computers, reads and writes much faster than the Commodore disk drive and operates with thousands of Commodore programs.

BCE 100 ..... **$178.95**

TURBOPRINT INTERFACE

$59.95 (with purchase of SG 10 Printer left)

The TurboPrint GC was specifically designed for use with Commodore computers. This performance interface prints enhanced Commodore graphics (on printers like the SG 10 above) and has a special line buffer that doubles text printing speed on printers without on-board memory. External dip switches allow you to select specific printer type and device number. Suggested retail on TurboPrint GC is $69.95 and is Unisource priced at $64.95. But with the purchase of the SG 10 printer above, you get the TurboPrint GC for only $59.95. Order part number **TEL 100.**

SPECIAL OFFER!! Get the TurboPrint GTC with optional 16K or 32K printer buffer for $69.95 with the purchase of the SG 10 printer. That's a $79.95 retail value! Order part number **TEL 101.**

SUPER STIK

$9.95

Quality joystick for the budget-minded Commodore user. The Super Stick control cable has built-in isolation electronics for use with the Commodore C64. This will offer the most from software as well as enhance motor skills. No adapter needed. Stick action for maximum enjoyment!

UNI 233S **$9.95**

UNISOURCE ELECTRONICS, INC.

7006 UNIVERSITY • P.O. BOX 64240
LUBBOCK, TX 79464
CALL TOLL FREE 1-800-858-4580
IN TEXAS CALL 1-806-745-8834

MasterCard VISA

FOR COMMODORE 64

• TRACKMIMIC™ •

— NEW —
Ver. 2.2
Protected Disk Backup System
Installs in 1541 Drive in Minutes
Just Plug It In!!
2 Minutes For Full Disk Backup
New Bit Density Detector
Automatic Operation, Hyperscan
Sector Edit (GCR), Bit Density
Tracks 1-45
• For All New Protection Methods •
89.95

• DISKMIMIC 5+™ •
Our Famous Automatic Backup System
49.95

DISKAT - Cataloging Program
Reads data directly from Disk, Holds 8000 Files, Makes Labels, Recalls 12 Way's, Alphabetizes Files, Printer/Screen Output.
34.95

A.I.D. CORP.
4020 Hempstead Turnpike • Bethpage, New York 11714
(516) 731-7100
Diskmimic 5™ is a trademark of A.I.D. Corporation
Commodore 64™ & 1541™ is a trademark of Commodore Electronics, Ltd.
Shipping & Handling — $1.50 each

Learn to
PLAY THE GUITAR
the EASY way with
Easy Guitar

Order today and be on your way to fame and fortune! Easy Guitar is the equivalent of dozens of guitar lessons.

C-64 disk

$29.95 plus $2.00 shipping & handling

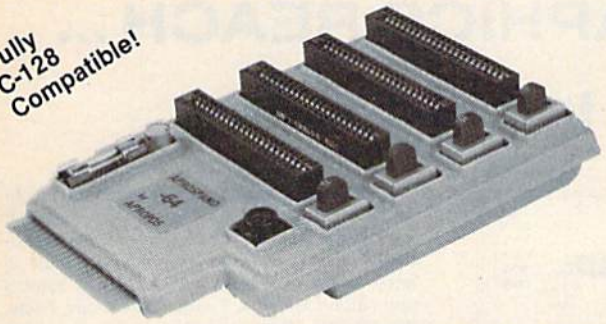
VISA & MC Accepted
or send check or money order to:

PJ SOFTWARE
10636 Main St., #414 • Bellevue, WA 98004
(206) 883-9257
Dealer inquiries welcome

APROSPAND-64™

Gives your Commodore 64 full expandability! This superbly designed expansion module plugs into the 64 & gives you 4 switchable (singly or in any combination) expansion connectors - plus fuse protection - plus a reset button!

Fully C-128 Compatible!



ONLY $39.95

Commodore Interface and Accessories

ParallAX-CD Parallel Printer Interface for use with all Commodore incl. SX-64 (except PET)...**$57.95**

DSI PPI with Graphics.....**$44.95**

Cardprint G-WIZ Printer Interface.....**$54.95**

AP-Switch -3P 3 to 1 Centronics Parallel Peripheral Switch. Switches active pins 1-18 and 31-36. Connects your computer to up to 3 parallel printers or up to 3 computers to one printer.....**$79.95**

Add Shipping Per Item: $3.00 Cont. U.S. $6.00 CAN, Mexico, HI, AK, UPS Blue

APROPOS TECHNOLOGY
1071-A Avenida Acaso, Camarillo, CA 93010
CALL OUR TOLL FREE ORDER LINES TODAY:
1-(800) 962-5800 USA or 1-(800) 962-3800 CALIFORNIA
TECHNICAL INFORMATION: 1-(805) 987-2454
All Products have 2 Week Satisfaction or Money Back Guarantee

CA Res. Add 6% Tax
Listed are cash prices.
Visa or MC add 3%

IT'S LIKE FREE DISKETTES

U.S. PAT. 4,488,358

Your 5¼" single side disks are usable on the other side. You paid for one side, why not use the other...**IT'S FREE!**

Nibble Notch will **open** your **new** disk. It's easy...won't harm existing data. Try it!

nibble notch 1 for Apple, Franklin, Commodore & Atari (w/Atari Drives) square notch.

ONLY $14.95* PLUS P&H

ALSO DISK SURGEON

Software for C-64 & 1541 Drive
- Read data from, edit & write to disk
- Analyze disk errors without "hammering"
- Read data under errors, erase errors
- Format a single track with any ID
- File copy to copy portions of a disk
- Single track copy • 4 minute copy of entire disk, and much more

FREE Nibble Notch
Buy the Disk Surgeon, get Nibble Notch 1 **Free!** A $45 value.
$29.95* FOR BOTH! PLUS P&H

QUALITY DISKETTES low as 99¢

*Add $2 ($5 foreign) for postage & handling. FL residents add 5% sales tax.

VISA MasterCard

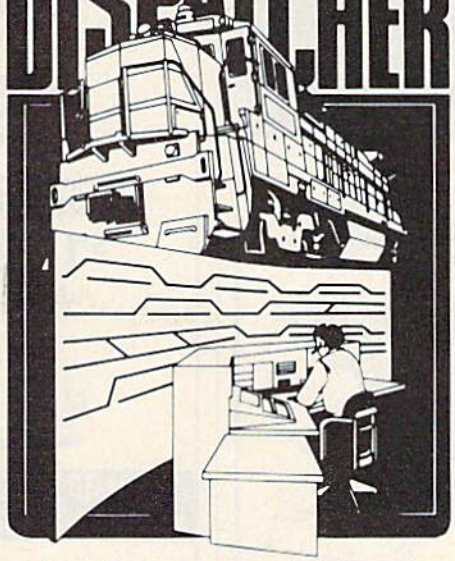
TOLL FREE 1-800-642-2536
FL (305)748-3770
or send check or money order to:

nibble notch® computer products
4211 NW 75th Terrace • Dept. 144 • Lauderhill, FL 33319

2 EXCITING COMPUTER SIMULATIONS from SIGNAL
COMPUTER CONSULTANTS

TRAIN DISPATCHER

Color TV or Monitor recommended.



Adapted for home computers by designers of systems for major railroads, **TRAIN DISPATCHER** faithfully simulates operations in a railroad traffic control center. In an accelerated 8 hour shift you must move up to 12 trains in both directions through a 150 mile territory–throwing switches and clearing signals to keep the trains on schedule.

VIC 20, COMMODORE 64 and ATARI 400, 800, 800XL versions available at $25.00. Apple II, II+, IIe, IIc $30.00; IBM PC $35.00. Tape or Disk except: ATARI 400-tape only; IBM PC and Apple-disk only. Other requirements: VIC-20-16K Ram; ATARI 400, 800-Basic; IBM PC-Graphics Card.

LOCOMOTIVE SWITCHER

LOCOMOTIVE SWITCHER brings an operating railroad layout to the COMMODORE 64 computer screen. The microlayout consists of mainline, six switches and seven loading areas. Sophisticated car-motion logic simulates train movements to a degree not possible on "real" model railroad layouts.

LOCOMOTIVE SWITCHER operates in two modes. As a FLAT YARD cars must be "spotted" at assigned loading docks – or pulled out to the mainline. In HUMP YARD mode the layout becomes a mini-classification yard. Operator performance is tracked and scored based on number of cars spotted, train moves, car damage and operating time.

For COMMODORE 64 only (disk or tape) at $30.00. Manual and keyboard template included.

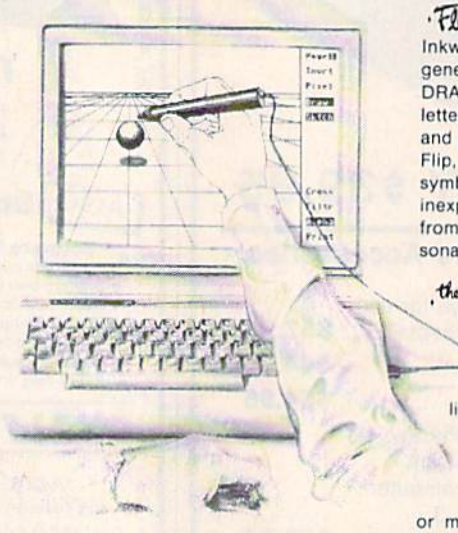
TRAIN DISPATCHER and **LOCOMOTIVE SWITCHER** are available from SIGNAL COMPUTER CONSULTANTS, Ltd., P.O. Box 18222,,Dept. 11, Pittsburgh, PA 15236, or call (412) 655-7727. US and Canada add $1.00 postage and handling ($2.50 foreign) for each game ordered. PA residents include sales tax. Use Master Card, VISA, moneyorders or checks drawn on US or Canada banks. Master Card and Visa show card number, expiration date and signature. We guarantee and support our products. Free replacement or full refund for 30 day warranty period. Dealer inquiries invited.

EXTEND YOUR GRAPHICS REACH...

with PENWARE PRODUCTS by Inkwell Systems

Flexidraw the light pen system for Commodore users who want easy Computer Aided Design with professional results. Whether drawing schematics or practicing your artistic talents, FLEXIDRAW will give you over 65 graphic features including two full screens, 16 colors, sprite animation, and library of technical symbols. The FLEXIDRAW system; quality light pen, disk, and manual, only $149.95.
Flexidraw is endorsed by the U.S. Commodore Users Group.

the Graphics Integrator the long awaited integration program for avid graphic artists and CAD users, will not only convert other popular graphics packages to Flexidraw and back, but also gives you the ability to create your own self-running slide shows in high resolution. Hi-res to Hi-res, Hi-res to Flexidraw, Multicolor to Multicolor, the Graphics Integrator is also compatible with Word Processing programs with external file capability for integration of text and pictures. ($29.95)



Flexifont an indispensable addition to your Inkwell graphics system, gives you character generation ability at the touch of your FLEXIDRAW light pen. Choose from the 33 built in letter styles or create with your own symbol and pattern libraries. Flexifont will Copy, Paste, Flip, Rotate, Print, and Edit saved or loaded symbols. At $29.95 (sugg. retail), Flexifont is an inexpensive necessity for creation of anything from official documents and newsflyers to personal letters and formal invitations.

the Graphics Galleria a variety of clip art and artistic renditions from Flexidraw users and professional artists. The Galleria will provide you with diskette libraries of large and small drawings from fantasy images to real-life recreations. Ideal for use in newsflyers, stationery, invitations and poster work, the Graphics Galleria can be used with Flexidraw or many other graphics packages when used with the Graphics Integrator. Available this winter for $29.95.

Inkwell Systems

For ordering, please call: **(619) 268-8792** or write:
7677 Ronson Rd., Ste. 210, San Diego, CA 92111
Shipping and Handling $4.00, Canadian and Foreign $8.00

Software Discounters of America

S.D. of A.

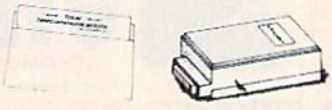
Orders Outside PA—1-800-225-7638
PA Orders — 1-800-223-7784
Customer Service 412-361-5291 **Open Saturday**

- **Free Shipping on orders over $100 in continental USA**
- **No surcharge for VISA/Mastercard**
- **Your card is not charged until we ship**

The only telecommunications package you will ever need.

Featuring:

THE INFO CENTER™
Free Subscription
to over 60 Popular Data Bases
• Auto Dial/
Answer Modem



26.88
Lowest Price Ever!!!

For Commodore 64®
Compuserve Starter Kit (5 hrs.) $19

***Ordering and Terms:** Orders with cashier check or money order shipped immediately. Personal/company checks, allow 3 weeks clearance. No C.O.D.'s. **Shipping: Continental U.S.A.**—Orders under $100 add $3; **free shipping on orders over $100.** PA residents add 6% sales tax. **AK, HI, FPO-APO**—add $5 on all orders. Sorry—no International orders. Defective merchandise will be replaced with same merchandise. Other returns subject to a 15% restocking charge—NO CREDITS! Return must have authorization number (412) 361-5291. Prices subject to change without notice.

COMMODORE

MONITOR
FULL COLOR
$154.00
RETAIL $289

1702

DISK DRIVE
$159.00
RETAIL $259

1541

PORTABLE VIDEO RECORDER

$199.00
RETAIL $600

COLOR VIDEO CAMERA WITH PORTABLE RECORDER

$799.00
RETAIL $1500

CALL TODAY!!
1-800-328-8322 Ext. 581

T & D ELECTRONICS
10517 UPTON CIRCLE
BLOOMINGTON, MN 55431

Commodore Service

3-5 Day
Turn Around

C-64 Repair $55.00
1541 Alignment . $35.00
1541 Repair $75.00
Other Computers . . $CALL

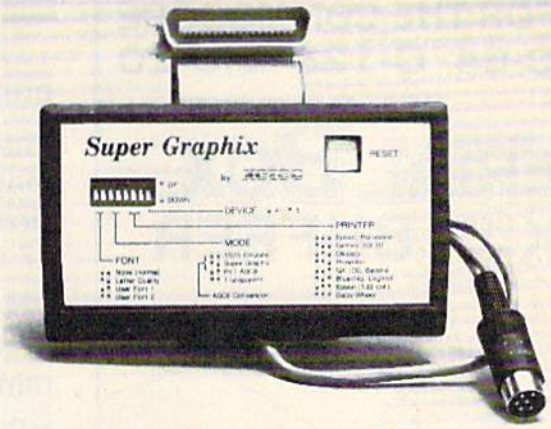
Parts & Return Shipping Included.
Parts & Power Supplies Also Available

To save C.O.D. charges — send Unit & Power Supply with check or M.O.

Second Source Engineering
9901 Horn Rd., Ste. B
Sacramento, CA 95827
(916) 364-5134

VISA · master charge

Super Graphix



You Asked For It . . . Here It Is!!!

GRAPHICS and FONTS-plus an 8K BUFFER for the ultimate in performance and speed. The XETEC Super Graphix interface for Commodore Computers now offers a new high in technology with these features:

- 8K Buffer Standard
- 10 Printing Modes
- 3 Internal Screen Dumps
- Extensive Command Channel
- Reset Button to Halt Printing from Buffer
- Switch Settings on Label for Quick Reference
- Correspondence Quality Font Built-In
- Capable of Storing 2 Additional Fonts
- Correct Graphics/Text Aspect Ratio for all Major Printers
- 8 Active Switches with Changes Constantly Monitored
- Internal Fonts Support Super-script, Sub-script, Underlining, Bold-face and Choice of 9 Pitches

Suggested list $99.95 • Includes Lifetime Warranty

XETEC, Inc. / 3010 Arnold Rd. / Salina, KS 67401 / 913-827-0685

NOW GET TRUE DESCENDERS FOR 801 & 1525 PRINTERS

FROM

WILANTA ARTS

The Descender ROM People

FEATURING :

* True descenders
* A pleasing alternative
* Uniform character formation
* No change in graphic capability
* No change in software compatibility
* No change in printer operation
* North American standard font
* Complete instructions
* Easy installation

$39.95 Cdn. $29.95 U.S.

Ont. Residents add 7% Prov. Sales Tax
Cheque, Money Order or MasterCard

WILANTA ARTS
6943 Barrisdale dr.
Mississauga Ont.
L5N 2H5

Phone 416-858-9298

Get a Wilanta Descender ROM today and make your old nightmare Just a font memory of yesterday!

KINDERGARTEN

...JUST GOT EASIER!

KINDER KONCEPTS–30 ACTION–PACKED PROGRAMS FOR PRE-SCHOOL TO REMEDIAL FIRST GRADE

★ **SOFTWARE REPORTS** GAVE THEM AN ALL "A" RATING
★ **ELECTRONIC LEARNING** LOVED THEM
★ YOUR KIDS WILL LOVE THEM TOO
★ MATH SERIES COVERS COUNTING, MORE, LESS, LONGEST, SHORTEST, MATCHING, SUBTRACTION, ONE-HALF, AND MORE...
★ READING SERIES COVERS SHAPES, MATCHING, ORDER, SEQUENCES, DISCRIMINATION,AND MORE..

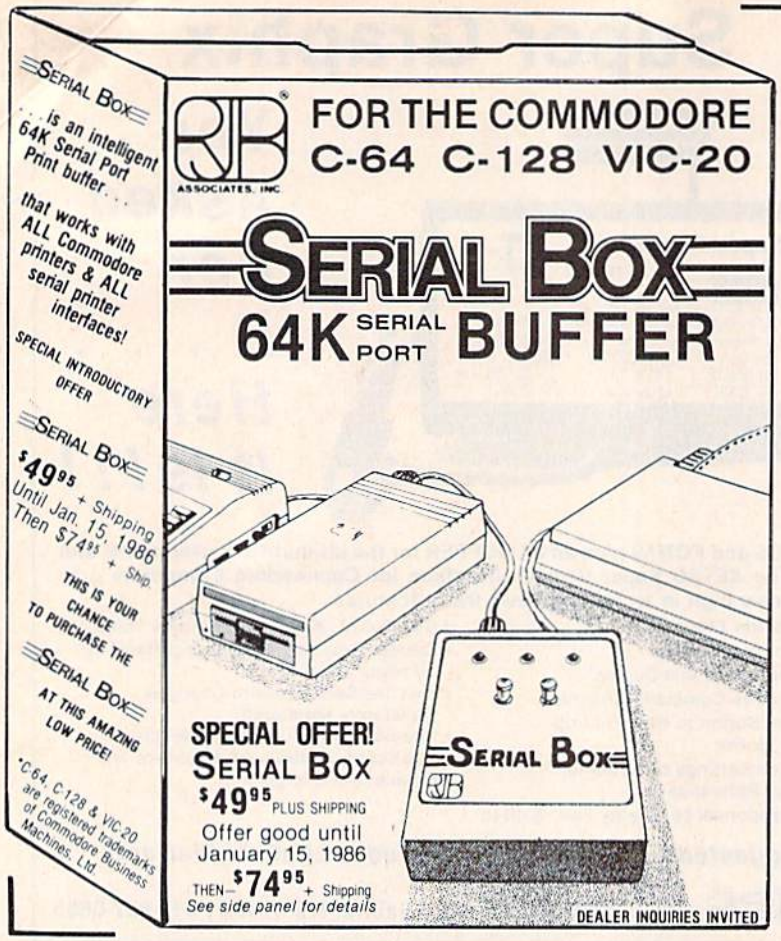
FOR APPLE II FAMILY, COMMODORE 64, PET

NO RISK-TRY THEM ON APPROVAL IN YOUR SCHOOL FOR 30 DAYS

Complete set with Backups (30 Programs)	$99.00
Reading Disk only with Backup (15 Programs)	$55.00
Math Disk Only with Backup (15 Programs)	$55.00

MIDWEST SOFTWARE
Box 214 Farmington, MI 48024
VISA / MASTERCARD

ORDER LINE 9:00 A.M. - 5:00 P.M. **1-800-422-0095**
Michigan, and orders after 5:00 P.M. - (313) 477-0897


SERIAL BOX
. . . is an intelligent 64K Serial Port Print buffer . . .
that works with ALL Commodore printers & ALL serial printer interfaces!
SPECIAL INTRODUCTORY OFFER
SERIAL BOX
$49.95 + Shipping
Until Jan. 15, 1986
Then $74.95 + Ship.
THIS IS YOUR CHANCE TO PURCHASE THE
SERIAL BOX
AT THIS AMAZING LOW PRICE!
*C-64, C-128 & VIC-20 are registered trademarks of Commodore Business Machines, Ltd.
RJB
ASSOCIATES, INC.
FOR THE COMMODORE
C-64 C-128 VIC-20
SERIAL BOX
64K SERIAL PORT BUFFER
SERIAL BOX
SPECIAL OFFER!
SERIAL BOX
$49.95 PLUS SHIPPING
Offer good until January 15, 1986
THEN—$74.95 + Shipping
See side panel for details
DEALER INQUIRIES INVITED

The
SERIAL BOX

. . . Lets you compute while your printer prints.

Imagine downloading a bit-mapped screen such as Flexi-draw or Koala-painter in 27 seconds!

You can dump 15 pages of text or a 35-page BASIC listing in 2½ minutes.

Oh yes . . .

SERIAL BOX

can even skip over perforations.

CALL: 1-800-228-7264 FOR ORDERS AND INFORMATION
IN PENNSYLVANIA CALL (215) 622-5495 OR WRITE:

R. J. Brachman Associates, Inc.

P.O. BOX 1077 • HAVERTOWN, PA 19083

Please add $3.00 for shipping and handling (USA and Canada)
VISA, MC, Check or Money Orders accepted. C.O.D. add $2.50.
PA residents add 6% (PLEASE ALLOW 4 TO 6 WEEKS FOR DELIVERY)

*Flexi-draw is a registered trademark of Inkwell Systems.
Koala Painter is a registered trademark of Koala Technologies Corp.

NEW VERSION 2.0

THE MIRROR

DISK COPIER

$24.95

NO FINER OR MORE ADVANCED ARCHIVAL COPIER AVAILABLE AT ANY PRICE.
EASY TO USE. DOES NOT CAUSE DRIVE HEAD TO KNOCK.
COPIES UP TO 41 TRACKS.
PERIODIC UPDATE POLICY.
AUTOMATICALLY MAKES BACK-UP COPIES FROM VIRTUALLY ALL PROTECTED SOFTWARE.
NIBBLES, HALF TRACKS, COPIES EXTRA SECTORS AND EXTRA TRACKS.
REPRODUCES ALL DISK ERRORS AUTOMATICALLY.
FAST, COPIES FULL DISK IN AS LITTLE AS 4-7 MINS. EVEN COPIES ITSELF.

WE COPY MORE!
MASTERCARD, VISA, M.O. OR CHECK OK
+ $3 SHIPPING & HANDLING
C.O.D. OR FOREIGN ORDERS ADD $2
CALIF. ORDERS ADD 6% SALES TAX
— WRITE OR CALL —

Compumed

(408) 758-2436
P.O. BOX 6427
SALINAS, CA 93912
FOR COMMODORE 64 AND 1541 DRIVE

THE MACHINE LANGUAGE CONSTRUCTION SET WITH THE VIRTUAL 64

The Ultimate Machine Language Programming Assistant for the Beginner!

Discover How Machine Language Really Works!!!

- Lets you program in machine language as easily as basic!!
- Comes complete with machine language subroutines that mimic many basic commands — use them just like basic!!
- Lets you see and change your program as you execute it, step by step!!
- Lets you see and change registers as you remain in complete control!!
- Lets you emulate the execution of machine language programs!!
- Comes complete with high powered machine language monitor!!
- Easy to use, well documented manual cuts learning time to a minimum!!
- Quick start procedure gets you programming in minutes!!
- Great for the novice!!

"New" NOTHING ELSE LIKE IT ON THE MARKET!!

ONLY $59.95!

Call (408) 424-5628 with VISA or MASTERCARD —
or send check or money order to:

EARTHWARE
P.O. BOX 130
CASTROVILLE, CA 95012-0130

Please add $3.00 for shipping and handling. California residents add 6% sales tax. C.O.D. orders add $3.00.

FOR COMMODORE 64

FACTORY AUTHORIZED

COMMODORE

REPAIR CENTER

1-800-772-7289

IN ILLINOIS (312) 879-2888

C64 Repair CPU only .	**39.95***
1541 Repair	**79.95***
1541 Alignment only	**29.95***
Power Supplies .	**32.95**
C128 & other products	**CALL**
Commodore Parts .	**CALL**

* Includes parts, labor & UPS shipping both ways. Air Freight add $10.00.

WARRANTY REPAIRS FREE**

** You pay shipping to us, we pay shipping back.

24-48 HRS TURN AROUND

CALL BEFORE SHIPPING

TEKTONICS PLUS, INC.

150 HOUSTON ST. — STE. 308

BATAVIA, IL 60510

CLIP AND SAVE

STAR-TECH SOFTWARE

proudly presents

MULTI-TERM

by

John Watson

The first multi purpose, multi functional terminal program for the Commodore 64.

Copy file for file at approximately 7 blocks per min.

Do the entire disk from track 1 thru track 36 without that horrible grating noise associated with errors encountered during the reading of a block.

With on-line help MENU.

Also on-line COMMODORE GRAPHICS for only

$39.95

Add $5.00 for shipping & handling to all orders for UPS Air. C.O.D. orders add $7.00. Send check or money order to **STAR-TECH SOFTWARE**. 8606 Standing Rock, San Antonio, TX 78242 or for further inquiries call **(512) 623-7197 (after 9:00 p.m. to 8:00 a.m. CST), call same number for our computer ordering B.B.S.**

We are a new company and we feel we should reward our customers. To the proud owner of the 1,000th **MULTI-TERM** Program we are sending a:

COMMODORE AMIGA SYSTEM with 256K

Suggested retail value $1,200.00

MUST LIQUIDATE!

LIMITED INVENTORY OF ULTRA FAMOUS

64K COMPUTERS

AT FAR BELOW DEALER COST!

Monitor is not available. See footnote.*

Millions sold at regular prices . . . and STILL being sold at regular prices!

Sorry, we're NOT permitted to print the brand name. But if you phone us, all details can be divulged.

Phone Toll-Free: 1-800-328-0609

PLENTY OF SOFTWARE AVAILABLE! Thousands upon thousands of programs are available for it from computer stores across the nation.

FOR BUSINESS! This is an ideal entry level business computer. Use the computer for word processing, data base, accounts payable/receivable, general ledger, payroll, inventory, tax accounting, spreadsheets, mailing lists . . . and much, **MUCH** more!

FOR EDUCATION! Perfect for everyone from Ph.D. candidates to preschool youngsters. A vast number of programs are available to challenge and educate the mind.

FOR HOME! Use for analysis of personal investments, income tax planning, storage of recipes and household data. And of course, there are **hundreds** of exciting, fast-paced arcade games available!

Units sold SINGLY or in any combination you desire.	Original List Price	YOUR COST
64K COMPUTER Item H-838-63553-00	$200.00	**$99**
DISK DRIVE Item H-838-63553-01	$269.00	**$149**
PRINTER Item H-838-63831-00	$200.00	**$118**
We reserve the right to limit quantity purchases. **TOTAL**	$669.00	**$365**

COMPUTER

64K RAM. 20K ROM standard (includes operating systems and BASIC interpreter). Text characters. High resolution graphics. 320 x 200 pixels. Music synthesizer produces 3 independent voices, each with a range of 9 octaves.

Typewriter keyboard with 66 keys for upper and lower case letters, numerals, symbols, reverse characters. 2 cursor control keys. 4 function keys, programmable to 8. Input/output ports for user, serial, ROM cartridge, 2 joystick/paddles, video, cassette drive interface. 16 background, border, character colors.

DISK DRIVE

Intelligent, high-speed. External 5¼" floppy diskette recorder. 2K RAM, 16K ROM. Maximum storage of 170K formatted data; 35 tracks. Uses single sided, single density disk. Serial interface. Second serial port for chaining second drive or printer. Data transfer rate of 400 bytes per second.

DOT MATRIX PRINTER

Bi-directional 6x7 dot matrix impact printer. 60 characters per second. Has upper and lower case letters, numerals and symbols. All PET graphic characters. Standard friction feed. Maximum of 80 columns width, dot addressable. CBM ASCII character codes. Original plus maximum of two copies. Paper width: 4.5" to 8.5". Size: 13"W x 8"D x 3¼"H. Weight: 6½ lbs. Power requirements: 120 volts AC, 60 Hz.

Factory Reconditioned With Factory Warranty.

*NOTE: If you do not have a monitor, you can use your TV as a display unit. The computer comes already to be hooked up to your TV.

Credit card customers can order by phone, 24 hours a day, 7 days a week VISA MasterCard

Toll-Free: 1-800-328-0609

TeleCheck Your check is welcome! No delays in orders paid by check.

C.O.M.B. CO.®

Authorized Liquidator

14605 28TH AVENUE NORTH

MINNEAPOLIS, MINNESOTA 55441-3397

C.O.M.B. CO.® Item H-838

14605 28th Ave. N./Minneapolis, MN 55441-3397

Send the following items. (Indicate quantity of each.)

___64K Computer(s) Item H-838-63553-00 at $99 each plus $8 each for shipping and handling.

___Disk Drive(s) Item H-838-63553-01 at $149 each plus $8 each for shipping and handling.

___Printer(s) Item H-838-63831-00 at $118 each plus $7 each for shipping and handling.

(Minnesota residents add 6% sales tax. Allow 3-4 weeks for delivery. Sorry, no C.O.D. orders.)

☐ My check or money order is enclosed. (No delays in processing orders paid by check, thanks to TeleCheck.)

Charge: ☐ MasterCard* ☐ VISA

Acct. No. _____ Exp. _____

PLEASE PRINT CLEARLY

Name _____

Address _____

City _____

State _____ ZIP _____

Phone _____

Sign here _____

Last Night, George Gershwin played my Casio*....

through the miracle of home computers and QRS Music. Now it's possible to turn your home computer into an entertainment center and music education machine. Just add our $49.95 MIDI and any MIDI instrument.**

*CASIO is a registered trademark of CASIO, Fairfield, N.J. QRS is a registered trademark of QRS Piano Roll Corp., MIDI MAGIC is a tradmark of MICROFANTICS Inc. Butler, N.J. Commodore is a registered trademark of Commodore Business Machines, Apple is a registered trademark of Apple Computer Inc.

**For best results an eight voice polyphonic instrument is recommended. QRS Music disks will also operate with the Passport MIDI Interfaces for the Commodore and Apple II + and Apple IIe.

The appearance of the MIDI on home organs and synthesizers opens up a whole new future for music. QRS Player Piano Rolls from 1900 to present day were performed by late great artists from Scott Joplin, Fats Waller, and George Gershwin to contemporary artists like Liberace, Peter Nero, and others. The QRS library (which spans over 85 years and contains over 10,000 songs) is being converted to floppy disk that are available for popular microcomputers.

THE COMMODORE 64 and 128, plus the APPLE IIc packages are now available for only $49.95. This includes a MIDI interface and a six song sample disk with CLASSICAL, CONTEMPORARY, SHOW MUSIC, and even RHAPSODY IN BLUE played by the composer GEORGE GERSHWIN in 1927. All you need is a MIDI equipped instrument**, the MIDI MAGIC interface, and your computer. For information about other supported computers, the QRS Music Disk Catalog, other MIDI products, and CASIO MIDI instruments, call or write:

Micro-W. DISTRIBUTING, INC

VISA MasterCard

Q·R·S BUFFALO, N.Y. 14213

1342B Route 23 Butler, N.J. 07405

(201) 838-9027 (201) 838-9127

DEALER & DISTRIBUTOR INQUIRES INVITED

MODEMS FOR COMMODORE®, ATARI®, APPLE® & IBM®

For COMMODORE® Use

TH002 300BPS/BELL 103

Retail $35.00

For ATARI® Use

TH003 300BPS/BELL 103

Retail $39.95

For APPLE® & IBM® Use

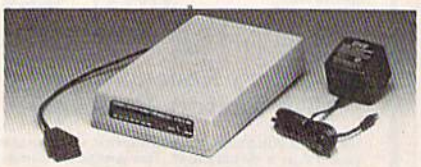
TH024 2400/1200/300BPS HAYES® COMPATIBLE

Retail $440.00

TH012C 1200/300BPS, BELL 212A/103

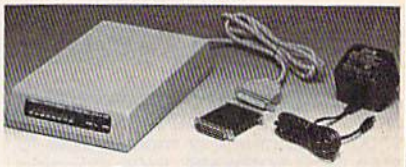
Retail $175.00

TH012D 1200/300BPS, BELL 212A/103



Retail $175.00

TH012A/B 1200/300BPS, BELL 212A/103 HAYES® COMPATIBLE



Retail $195.00

For Retail & Dealer Price, Please Contact Following Reps

U.S.A.

A. C. ELECTRONIC
(805) 9687272 CA.

CODOM INC.
(305) 9871122 FL.

PM SALE
(206) 9358519 WA.

J. LEFEBVRE & ASSOCIATES
(713) 7717728 TX.

ACS COMMERCIAL INC.
(213) 6963187 CA.

CANADA

RAITONIC
(604) 8750207
VANCOUVER

PHASE 4
(403) 2520911
ALBERTA

M&M SALES
(514) 7386580
MONTREAL

For OEM & Importer Price, Please Contact

TAIWAN HWAN HONG ENTERPRISE CO.
P.O. BOX: 18—48 PANCHIAO, TAIPEI HSIEN, TAIWAN, R.O.C.
ADDRESS: 6TH FL., NO. 163, HAN-SHENG E. ROAD, PANCHIAO, TAIPEI HSIEN, TAIWAN, R.O.C.
TELEX: 31228 TAIHAHO
CABLE: TAIHAHO
TEL: (02) 959-1166 (5 LINE)

TEE SHIRTS

CS 1010

CS 1050

CS 1035

CS 1075

COMPUTER SHIRTS $10.00
All shirts are American made
Include style number and sizes
(S,M,L,XL) when ordering.
Include $1.50 shipping & handling
Send check or money order to:
LONG LIVE ROCK
1246 E. 69 Street
Brooklyn, NY 11234

FREEDOM ASSEMBLER

3 PROGRAMS IN ONE CARTRIDGE

① SYMBOLIC ASSEMBLER
② POWERFUL MONITOR
③ CODE DEBUGGER

based for VIC-20 C-64 use in 128 in 64 mode

written 100% in machine language

$ 39.95

write your own machine code for 6502 - 6510 - or 65CO2

NOW FOR C-128

$49.95 AN ALL NEW VERSION CARTRIDGE TAKES ADVANTAGE OF THE 128'S POWER

Uses 2 Mhz for lightning FAST Assemblies

NOW for C-64 and the C-128 in 64 mode. cartridge based

ZIPP-CODE -48

CROSS ASSEMBLER FOR 6748 8048 8049

Write code for smart peripherals or robotics - hobby or industry.

Full Simulator! $49.95

FREEDOM EDITOR

NEW!

A Cartridge based EDITOR that aids in creating, debugging, and modifying BASIC programs. Includes: VIEW the directory, FIND; MOVE, COPY, DELETE, APPEND plus MANY more

C-128 IN 128 MODE $29.95 C-64

Hughes Associates

Dept. 10
45341 Harmony Lane
Belleville, Mi 48111

FREE SHIPPING
COD add $3.00
Check or money order U.S. funds

MUST LIQUIDATE

COMMODORE COMPATIBLE BELL & HOWELL DOT MATRIX COMPUTER PRINTER AT BELOW DEALER COST!

PUBLIC NOTICE

INTENSE COMPETITION IN THE COMPUTER INDUSTRY LEADS TO UNPROFITABLE LINE FOR BELL & HOWELL

C.O.M.B. authorized to liquidate recent model printers at BELOW dealer cost!

FACTORY NEW! FIRST QUALITY!

Bell & Howell Model P-100 Made in U.S.A.

Size: 16" W x 10½" D x 6" H
Weight: 15 lbs.

- **Fast, 100 characters per second!** (for faster model, see below.)
- **Heavy-duty for constant use on big jobs!**
- **Compatible with Commodore 64 & SX64!**

Save hundreds of dollars on a top name brand!

Here's a sensational value on a fast-operating, excellent quality, heavy-duty printer. It **INCLUDES** an interface for hookup to your **Commodore 64 or Commodore SX64.**

Compared to many competitive models, **THESE** printers are **FASTER!** Virtually trouble-free. Built to handle **BIG** office jobs. The P-100 has a memory which allows data storage **WHILE** the printer is running! And it can print in a variety of type styles, from **large and bold to small and light!**

Other special features include: Easy loading, long-life cartridge ribbon. Crisp printing. And, with your purchase, you get a TOLL-FREE phone number to call for useful tips or questions you might have.

CHARACTER SET: Full upper and lower case 96 character ASCII set with descenders and underlining. Software selectable single or double wide character fonts. **GRAPHICS:** High resolution dot addressable graphics.

PRINT FORMAT: 8" line length; 80 characters per line at 10 CPI; 136 characters per line at 17 CPI.

PAPER SLEW (ADVANCE): 10 lines per second, stepper motor controlled. User selectable pressure roller or tractor feed.

DATA INPUT: Parallel. Centronics type 7-bit ASCII. TTL level with STROBE. ACKNOWLEDGE returned to indicate data was received. **SERIAL:** RS232C. With BUSY handshake. 10 or 11 bits: 110, 150, 300, 1200 Baud. **INPUT POWER:** 115 volts.

PRINT RATE: 100 characters/second. Data Buffer: 1K (Optional expandable to 2K).

OPERATIONAL CONTROLS: Power on/off, set top of form, select/deselect, line/forms, feed.

MEDIA: Roll paper: 8½"W x 5" dia. single ply or pressure sensitive multiple copy paper. .012" max. thickness. Fan fold paper: 1" to 9½" sprocket (including sprocket margins). .012" max. thickness.

CUT SHEET PAPER: max. width, 9½".

TYPE OF PRINTING: Impact bidirectional, 7x9 dot matrix for data printing, 11 x 9 matrix for correspondence printing.

RIBBON: Continuous loop cartridge, 20 yards by 1/2" ribbon, 5 million character life.

90 Day Limited Factory Warranty on Printer Parts and Labor!

Mfr. List Price (with interface) $644.95

Includes Commodore Interface! Price Now Only: $238

Item H-866-63327-10 Ship, handling: $10.00

HI-SPEED MODEL P-150
150 characters per second!

Same specifications as P-100 above, but with following special features: Tractor feed. 2K data buffer (optional: expandable to 4K and/or 68K). Paper advance of 20 lps. 14⅞" maximum paper width. Impact logic seeking printing. 50 yd. loop cartridge ribbon: 10 million characters. Size: 23" W x 15½" D x 7½" H. Weight: 25 lbs. Interface included. **$288**

Item H-866-63327-11 Ship, handling: $14.00

Price subject to change after 60 days.
Sales outside continental U.S. are subject to special conditions. Please call or write to inquire.

VISA MasterCard

Credit card members can order by phone, 24 hours a day, 7 days a week!

Toll-Free: 1-800-328-0609

TeleCheck

Your check is welcome! No delays when you pay by check!

C.O.M.B. CO.®
Authorized Liquidator
14605 28TH AVENUE NORTH
MINNEAPOLIS, MINNESOTA 55441-3397

C.O.M.B. CO.® Item H-866
14605 28th Ave. N./Minneapolis, MN 55441-3397

Please send items indicated below. (Minnesota residents add 6% sales tax. Allow 3-4 weeks for delivery. Sorry, no C.O.D. orders.)

___ P-100 Printer(s) with interface at $238 each plus $10.00 each for ship, handling: Item H-866-63327-10

___ P-150 Printer(s) with interface at $288 each plus $14.00 each for ship, handling: Item H-866-63327-11

☐ My check or money order is enclosed. (No delays in processing orders paid by check, thanks to TeleCheck.)

Charge my: ☐ MasterCard™ ☐ VISA

Acct. No. _____ Exp. _____

PLEASE PRINT CLEARLY

Name _____

Address _____

City _____

State _____ ZIP _____

Phone _____

Sign here _____

advertiser's index

Reader Service Number/Advertiser	Page
Aardvark	138
102 Abacus Software	109
103 Abacus Software	111
104 Abacus Software	113
105 Abby's Discount Software	101
106 Access Software, Inc.	91
107 Accolade Inc.	78
108 Accolade Inc.	78
109 Accolade Inc.	79
110 Accolade Inc.	79
111 Acorn of Indiana, Inc.	181
112 Activision	56
113 A.I.D. Corp.	184
114 Apropos Technology	185
115 Aprotek	95
116 Aquarian Software	173
117 Artificial Intelligence Research Group	164
118 Avalon Hill Game Co.	9
119 Basement Boys Software	117
120 Basix	44
121 Basix	75
122 Basix	107
Batteries Included	27
123 Bible Research Systems	118
124 Big Bytes	170
125 Blackship Computer Supply	183
126 Blue Chip Electronics	96
Brantford Educational Services	170
127 Bytes & Pieces, Inc.	182
128 Cardco, Inc.	IBC
Cardinal Software	118
129 CDI/Computer Devices International	33
130 Central Point Software, Inc.	180
131 Cheatsheet Products Inc.	174
132 The CHF Company	90
133 CMS Software Systems, Inc.	81
134 Columbia Software	128
Comal Users Group, U.S.A., Ltd.	106
C.O.M.B. Co.	169
C.O.M.B. Co.	189
C.O.M.B. Co.	191
Commodore	BC
Commodore Software Association	179
135 Compumed	188
136 CompuServe	IFC–1
137 CompuSoft Publishing	172
138 ComputAbility	125
139 ComputAbility	126–127
140 Computer Centers of America	30–31
141 Computer Mail Order	168
Computer Management Corp.	161
Computer Place	178
142 Computer Warehouse	174
143 The Comtel Group	71
144 Contriver Enterprises Co., Ltd.	183
145 Cornucopia Software	117
Covox Inc.	126
146 Crown Custom Covers	192
147 CSM Software, Inc.	50
148 Davidson & Associates, Inc.	93
149 Decision Sciences, Inc.	180
150 DES-Productions	183
151 Disktronics	176
152 Digital Solutions Inc.	87
153 Digital Solutions Inc.	107
154 Digital Vision, Inc.	176
Diversions, Inc.	181
155 DJ Software	184
156 Earthware	188
157 Electronic Arts	47
158 Electronic Arts	57
159 EPYX	39
160 EPYX	41
161 EPYX	43
162 Firebird	83
163 General Software Store	192
164 Glenco Engineering Inc.	164
Handic Software, Inc.	4
165 Hardy Services	183
166 Home Software Systems	181
Hughes Associates	191
167 Infocom	77
Infodesigns	23
168 Inkwell Systems	186
169 Integrated Software Systems	178
Intelligent Software	182
170 Jason-Ranheim	175
171 Jason-Ranheim	178
172 John Henry Software	35
Ksoft Co.	107
173 Kyan Software	121
LIDON Enterprises	62
174 Lindner Contracts Ltd.	92
175 Long Live Rock	191
Lyco Computer	114–115
176 Mastertronic International	61
177 Maxtron	117
178 MegaSoft Ltd.	69
179 MegaSoft Ltd	104–105
180 Melodian, Inc.	166–167
181 Merritt Micro Systems	192
182 Microlog	182
183 Micro Prose Simulation Software	51
184 Micro Prose Simulation Software	63
185 Micro Prose Simulation Software	180
186 Micro-W Distributing, Inc.	190
187 Micro World Computers, Inc.	180
188 Midwest Software	187
189 Mimic Systems, Inc.	84
190 Mindscape, Inc.	18–19
191 Mindscape, Inc.	21
192 Mindscape, Inc.	23
Nibbles & Bits	84
193 Nibble Notch Computer Products	84
194 OKidata	14–15
195 Orpheus	85
196 Ortho Information Services	29
197 Pacific Exchanges	183
198 Parsec Research	161
PC Gallery	165
199 Playnet, Inc.	183
200 Precision Data Products	183
201 Protecto	130–135
Research Service Labs	181
202 Richwood Software	89
203 R. J. Brachman Associates, Inc.	188
204 R. Lewter & Associates	183
205 R.P.M. Concepts, Ltd.	183
206 Scarborough Systems, Inc.	11
Schnedler Systems	176
Second Source Engineering	187
207 Signal Computer Consultants	185
208 Simon & Shuster	56
209 Skyles Electric Works	121
210 Software Discounters of America	171
211 Software Discounters of America	186
Solid State Software	164
212 Sound Software, Ltd.	84
213 Star Micronics	103
214 Star-Tek Software	189
215 Strategic Simulations, Inc.	55
216 subLOGIC Corporation	13
217 subLOGIC Corporation	65
218 Taiwan Hwan Hong Enterprise Co.	190
219 T & D Electronics	186
Tektonics Plus, Inc.	189
220 Tenex Computer Express	162–163
221 Timeworks, Inc.	7
222 Triad Computers	121
223 Tussey Computer Products	98–99
224 Tymac Controls Corporation	67
Ultrabyte	181
225 Uni-Kool	90
226 Unisource Electronics, Inc.	184
227 Universal Mktg.	177
228 Votrax, Inc.	119
229 Welwyn/Currah	73
230 White House Computer	172
231 Wilanta Arts	187
232 World Trade	122–123
233 Xetec, Inc.	187
234 X-10 Powerhouse	53

Classified Ads	110
COMPUTE!'s Commodore Books	45
COMPUTE!'s Commodore 64 Books Collection	88
COMPUTE!'s Gazette Disk	48
COMPUTE!'s Gazette Subscription	17
Telecomputing on the 64	82
40 Great Flight Simulator Adventures	52

DUST COVERS

★ CUSTOM MADE TO FIT
★ Heavy 32-oz. VINYL ANTI-STATIC
★ EXTENDS EQUIPMENT LIFE
★ Choice of Colors Lt. Tan or Brown

COMPUTERS

C-64; VIC-20; C-16; PLUS 4 ..... 7.00
C-128; B-128 ..... 13.00
DATASETTE (NEW, C2N) 5.00

DISK DRIVES

C-1541; C-1571 INDUS GT 8.00
MSD S/D; APPLE S/D 8.00
MSD D/D; APPLE D/D UNIT 10.00

PRINTERS

C-1525/MPS801 ..... 10.00
C1526/MPS802 ..... 13.00
C/MPS 803; C-1520; C-1530 ..... 8.00
PANASONIC KX-P1090/91 ..... 13.00
EPSON MX/RX/FX 80 ..... 13.00
GEMINI 10 & STAR 10's 13.00
GEMINI 15 & STAR 15's 16.00
OKIDATA 91/92 ..... 13.00
JUKI 6100 ..... 16.00
OKIMATE 10 ..... 8.00

MONITORS

C-1702/1703; C-1902 RGBI 16.00
ZENITH ZVM 122/123 ..... 16.00
ZENITH ZVM 131/133 ..... 23.00
TAXAN RGB 2110 ..... 16.00
AMDEK COLOR I 19.00
BMC COLOR 16.00
VIDEO RECORDERS 13.00
(Dimensions Required)

Order by stating NAME and MODEL and COLOR CHOICE TAN or BROWN.
Enclose check or money order plus $1.50 per item (4.50 max.) shipping and handling California Res. Include 6.5% Sales Tax.

SPECIAL COVERS WILL BE MADE TO YOUR DIMENSIONED SKETCH. SEND YOUR REQUIREMENTS FOR OUR LOW PRICE QUOTES

Crown Custom Covers
9606 SHELLYFIELD ROAD-Dept. A
DOWNEY, CA 90240
(213) 862-8391

Old-fashioned Values!

Program collections are homemade and public domain software complete with documentation.
Disk only - Commodore 64 and 128.

Note: Some of the C-128 programs will not run on the C-64. Please specify computer; we'll send the 64 version if you don't.

PRACTICAL
Collection #1

Fourteen programs only $12.95. Includes word processor, database manager, checkbook, charge account manager, financial programs, phone book, and eight more.

DISK UTILITY
Collection #3

Twenty three programs only $13.95. Utility programs to make your life with disks more enjoyable. Includes copy programs (including a super-backup that will backup almost any disk) for single or dual drives, file utilities like examiners, software protectors, copiers, and scratchers, directory repair, a fast formatter, and more. (Not for beginners!)

MISCELLANEOUS & GAMES
Collection #5

Eighteen programs for $9.95. Dungeon maze, concentration, BINGO, blackjack, stock market, hangman, biorhythm with biocompatibility, letter puzzle, battleship, space fighter, and more.

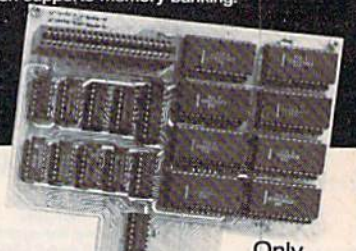
Plus lots more!! Write for free catalog.

We accept checks, money orders, VISA, MasterCard, COD's, and almost any reasonable form of exchange. For credit card orders, please include card number, expiration date, and signature. Please add $2.00 for shipping and send order to:

General Software Store
1146 Eastwood Drive
Fayetteville, AR 72701
Phone: 501-442-0579

Cartridge back-ups made easy!

- Makes working copies of all C64 program or game cartridges — fully automatic operation — no confusing DIP switches or LED's — no programming knowledge required.
- Copies onto disc or cassette — either will hold several cartridges for convenient storage and access — select and run cartridges from convenient menu (disc only).
- Comes complete with 16 K RAM — includes hardware logic for true cartridge emulation — even supports memory banking.



Smart Cart
Only $79.95
plus $3 handling and shipping
(Texas residents add 5% sales tax)

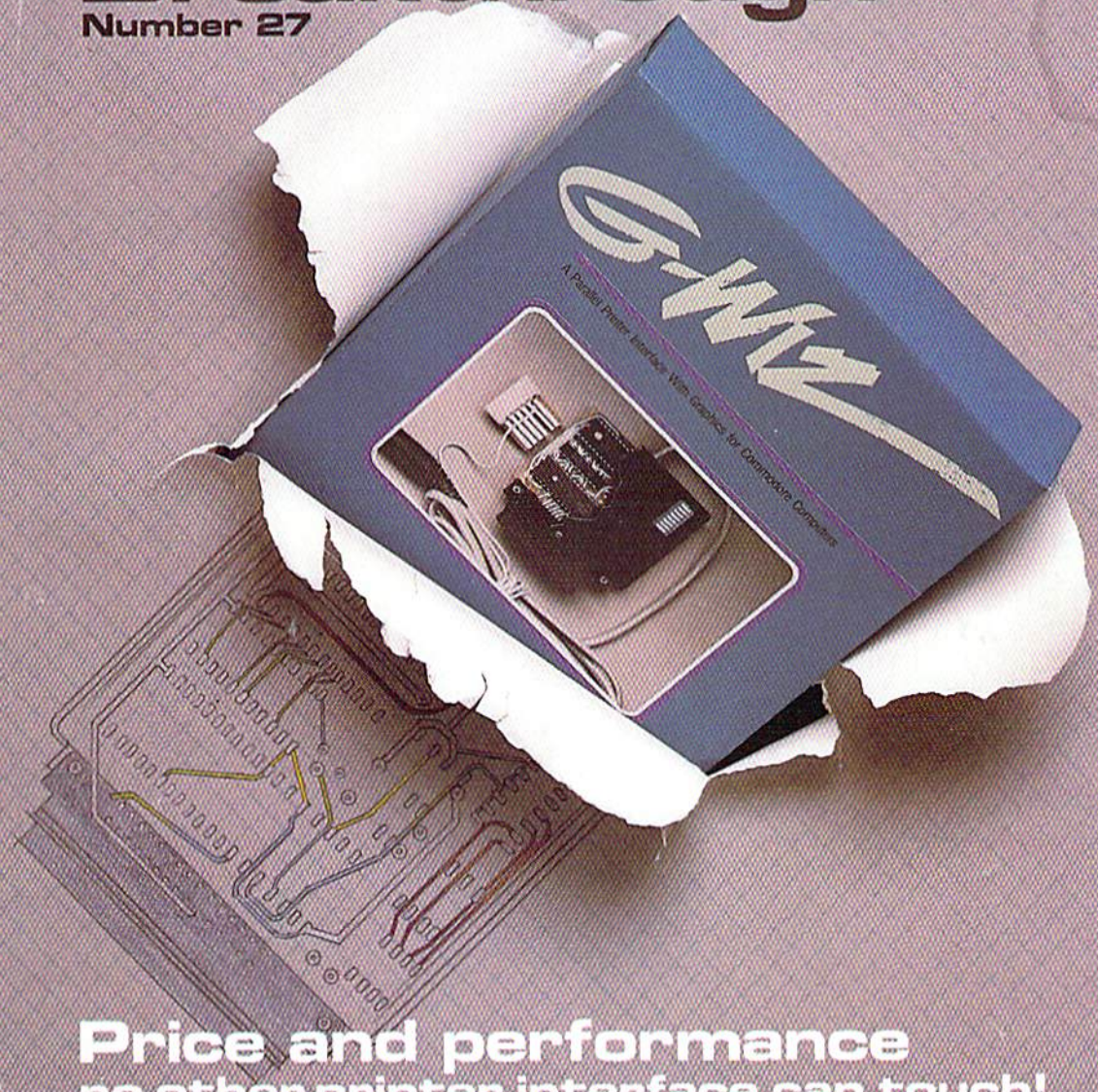
Satisfaction unconditionally guaranteed or your money refunded.

Send check or money order to:
Merritt Micro Systems
P.O. Box 832505
Richardson, TX 75083
• Delivery from stock.
• Specify Smart Cart operating program on disc or cassette (procedures included with cassette to upgrade to disc).
Additional information or COD orders (214) 231-1140

Technical

Breakthrough

Number 27



Price and performance
no other printer interface can touch!

Only CARDCO would dare improve on its own best seller (the +G has far out-sold any other printer interface, and has set the industry standard by which competitors are judged). The G-Wiz is even better — and costs 30% less.* Our 27th major innovation in Commodore accessories has all the +G's features, and more...

Built-In Buffer for More Speed
The G-Wiz buffer dumps high-resolution screens up to 18 times faster than competitive interfaces without buffers. No more waiting! A complex 50-minute printout now takes just 2.5 minutes with the G-Wiz.

Exclusive! Aspect Ratio Selection
Only the G-Wiz matches graphics characters to standard characters on Okidata, Epson, Star Micronics, Prowriter, Smith Corona, C-ITOH, Gorilla Banana, and many other dot matrix printers. Now you can perfectly align high resolution graphics characters within text blocks, or in columns.

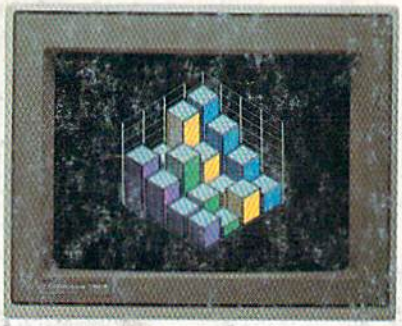
CARDCO excellence triumphs again! The G-Wiz is the "best bang for the buck" on the printer interface market today — and it's backed by CARDCO'S exclusive lifetime warranty! G-Wiz: another distant target for the competition to shoot at.

CARDCO, Inc. 300 S. Topeka/Wichita, KS 67202

*Actual price may vary according to dealer and region

The Wizards from the Land of Oz Have Done It Again!

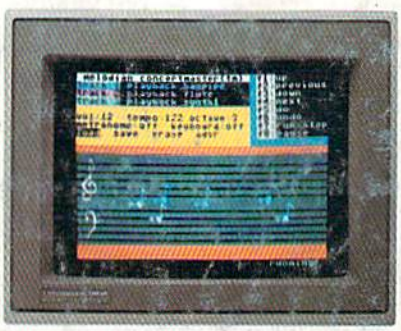
All you need to do this



graph a spreadsheet

write a novel

fix an engine

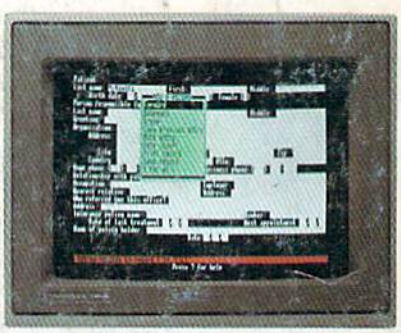


compose a song

paint a picture

our banking

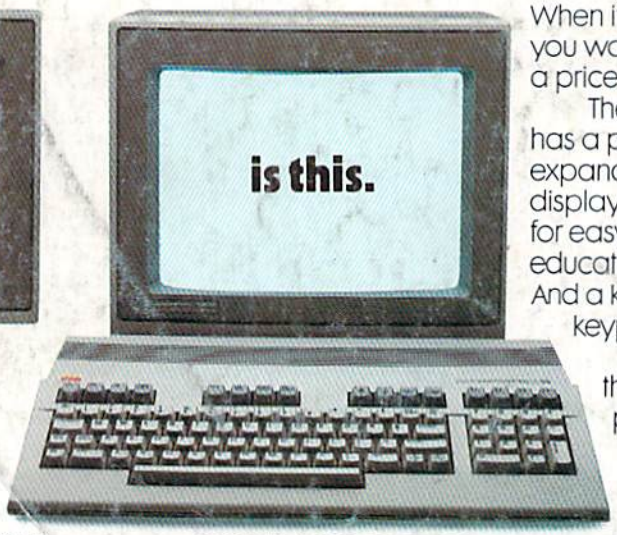
learn to fly



organize a data base

tell a story

forecast sales



When it comes to personal computers, you want the smartest you can own. At a price that makes sense.

The new Commodore 128™ system has a powerful 128K memory, expandable to 512K. An 80-column display and 64, 128 and CP/M® modes for easy access to thousands of educational, business and home programs. And a keyboard, with built-in numeric keypad, that operates with little effort.

Discover the personal computer that does more for you. At the price you've been waiting for. From the company that sells more personal computers than IBM® or Apple.®

© 1985, Commodore Electronics Limited
® CP/M is a registered trademark of Digital Research, Inc.
® Apple is a registered trademark of Apple Computer, Inc.
® IBM is a registered trademark of International Business Machines Corporation

COMMODORE 128 PERSONAL COMPUTER

A Higher Intelligence